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# FROZEN FOOD LOCKER COOPERATIVES

WORLD WIDE MARKETING FACILITIES  
FROZEN FOOD PERFORMANCE

FCC Research Report No. 115  
Farmers Cooperative Service  
15 Cooper Lane, Stamford, Connecticut

**FARMER COOPERATIVE SERVICE  
U.S. DEPARTMENT OF AGRICULTURE  
Washington, D. C. 20250**

Farmer Cooperative Service conducts research, advises directly with cooperative leaders and others, promotes cooperative organization and development through other Federal and State agencies, publishes results of its research, and issues *News for Farmer Cooperatives* and other educational material.

This work is aimed to help (1) farmers get better prices for their products and reduce operating expenses, (2) rural and small-town residents use cooperatives to develop rural resources, (3) these cooperatives expand their services and operate more efficiently, and (4) all Americans understand the work of these cooperatives.

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## Highlights

Important findings from the 10 large plants studied follow:

- A shift in slaughter volume from hogs to cattle improved operating performance by distributing volume more uniformly throughout the year. However, the sizable increase in cattle slaughter volume makes the limited size of existing carcass age coolers the major restraint to future growth.

- A shift in meat processing volume from pork to beef also occurred in plants with and without slaughtering facilities. Declines in pork custom processing volume affected other income-producing services like curing and sausage making. However, increased beef processing volume not only offset lower pork processing volume, but also accounted for increases in total processing volume. The plants with slaughtering facilities increased total meat processing volume substantially faster than the ones without slaughtering facilities.

- In 1966, farm families accounted for 75 percent of all patrons served by large plants with slaughtering facilities and two thirds of all patrons served by plants without slaughtering facilities. Generally, farm families patronize their locker cooperative for custom services it provides and nonfarm families do so for the meat and meat products it sells.

- Employees in the locker cooperatives with slaughtering facilities were more productive and refrigerated space was used more efficiently than in plants without slaughtering facilities. Furthermore, members and patrons of the cooperatives with slaughtering facilities were served more effectively than those of plants without slaughtering facilities.

- A principal goal of both groups of the large plants was to realize a 10-percent net savings on total operating income. The cooperatives with slaughtering facilities achieved that goal while the ones without slaughtering facilities were approaching it.

Important findings from the small plants studied include:

- Small locker cooperatives with and without slaughtering facilities served farm families on a custom basis. Neither group promoted food merchandising to any extent, and neither served any wholesale or institutional accounts.

- The volume of products handled in every department—slaughtering, processing, curing, sausage making, etc.—of small locker cooperatives has declined since 1960. This downward trend is cause for serious concern about the future of these small cooperatives as viable business organizations.

- The small plants with slaughtering facilities realized net losses on locker operations every year since 1960 thus reducing members' equity in their cooperatives. Similarly, the small plants without slaughtering facilities realized net losses during 5 of the 7 years between 1960 and 1966, also reducing members' equity in their cooperatives.

- Both groups of small plants effectively served the needs of the members that patronized them. However, patronage declined. Conditions not explored by this study apparently caused that decline which was more severe in plants with than in plants without slaughtering facilities.

- The rates charged for custom services provided by the small locker cooperatives were substantially lower than those charged by the large locker cooperatives and by other plants in the industry. This is partially responsible for their poor financial performance.

- A basic comparison of the large plants with and without slaughtering facilities and the small plants with and without slaughtering facilities in 1966 is shown in the following tabulation:

Item	Unit	Large plants—		Small plants—	
		With slaughtering facilities	Without slaughtering facilities	With slaughtering facilities	Without slaughtering facilities
Animals slaughtered	No.	4,517	--	624	--
Meat processed:					
Total	Lb.	801,000	629,000	198,000	55,000
Per patron	do.	391	253	334	295
Per man-year	do.	140,895	133,930	96,810	89,500
Pork cured	do.	61,000	72,000	13,000	3,000
Sausage made	do.	16,200	28,400	3,725	1,080
Refrigerated space	Cu. ft.	35,770	36,030	14,275	5,175
Processing charge:					
Beef	Dols./cwt.	5.65	5.80	4.50	4.25
Pork	do.	5.00	5.50	4.40	4.25
Employment	Man-yr.	12.6	8.3	3.4	0.8
Patrons served	No.	2,287	2,949	645	240
Lockers:					
Available	do.	846	666	426	285
Rented	do.	794	494	223	193
Rental rate	Dols./yr.	14.40	13.45	12.05	10.35
Total revenue	Dols.	86,119	65,513	19,903	4,015
Net gain (loss)	do.	9,006	6,132	(1,967)	(210)



# Frozen Food Locker Cooperatives With and Without Slaughtering Facilities: Production and Performance

by Richard P. Parsons  
New Services Division

The frozen food locker industry peaked during 1950 at 11,600 plants, of which 925 were cooperatives owned and operated by farmers. After 1950, these plants began adjusting to technological and economic changes within the industry and to the changing socioeconomic conditions that have characterized rural trade areas in the past two decades. The managements of many frozen food locker cooperatives, once the industry's pacesetters, failed to make the necessary adjustments in their programs that would permit their organizations to survive. Consequent-

ly, cooperatives went out of business faster than other locker plants. In 1965, an estimated 385 of the industry's 7,200 locker plants were farmer-owned and controlled.

Small volume, limited service, inadequate finances, or poor management accounted for a major portion of the cooperative failures. Many of the 385 frozen food locker cooperatives in business today are extremely small operations offering a limited number of services. They have a declining volume of output and increasing net losses on operations, while many of the large firms have an increasing volume of output.

## Method, Scope, and Purpose of Study

Twenty frozen food locker cooperatives—five large-volume plants with and five without slaughtering facilities, and five small volume plants with and five without slaughtering facilities were studied to evaluate the differences in their operations.

The classification of large or small was based on the volume of meat processed, as reported on questionnaires submitted during Farmer Cooperative Service's 1965 national survey of the frozen food locker industry. Large plants with slaughtering facilities processed more than 500,000 pounds of meat, and large plants without slaughtering facilities processed more than 325,000 pounds of meat. These amounts represent twice the average volume of meat processed by each group of plants in 1964.

The purpose of this study was to determine if frozen food locker cooperatives with livestock slaughtering facilities have been more successful in generating additional

volume of output, and achieving a higher level of labor productivity and greater operating efficiency than those without slaughtering facilities.

The findings can help managers and directors determine appropriate services and levels of output necessary for financial success. Farmers and other rural groups interested in organizing food provisioning cooperatives will also find this report helpful during their discussions and decisionmaking processes.

Four major factors—volume, patronage, efficiency, and operating income and expenses—were considered in comparing plants with and without slaughtering facilities. Other factors studied included facilities, service rates, and employment. Each factor was examined in detail to identify the activities contributing to success in locker plant operation.

Audit reports, general ledgers, and output records for fiscal years 1960, 1962, 1964, and 1966 provided most of the necessary information. Fiscal 1960 was the earliest year studied because complete records for years prior to 1960 were not available in several plants.

Findings are presented in two sections of this report. The first section analyzes and compares large plants with livestock slaughtering facilities with large plants without facilities. The second section does the same for small plants.

The sample was drawn from 170 locker cooperatives.

However, trends, operational problems, and opportunities for growth identified by this research and discussed in this report have industry-wide implications.

This study has special application to frozen food locker cooperatives since the enactment of the Wholesome Meat Act of 1967. Cooperatives need to examine both their merchandising and custom service programs, especially the livestock slaughtering service, as a first step in complying with the law's regulations. Comparison of findings in this report will help guide management in its decisions regarding this particular service.

## Large Locker Cooperatives With and Without Slaughtering Facilities

The objectives of large locker cooperatives with and without livestock slaughtering facilities were essentially the same: To process and store food products; to purchase food and other supplies at lower cost or of superior quality than is available elsewhere; and to perform other services requested by members. Management of large cooperatives with livestock slaughtering facilities interpreted these objectives differently than management of plants without slaughtering facilities. Trends in business activities between these two groups are related to the different interpretations of those objectives.

Large cooperatives with slaughtering facilities view their basic objective as providing custom services to farm families. These cooperatives merchandise meat and other food products and serve nonfarm families only after the demand for custom services by farm families has been satisfied and then only to the extent that the additional activities improve operating efficiency.

Large plants without slaughtering facilities also provide custom services to farm families, but since 1964 they have shifted emphasis from custom services to merchandising food products. Paralleling this change has been a shift in patronage from farm to rural nonfarm families. Both changes have had a measurable impact on operations.

### Volume

Volume of product handled is the paramount factor in determining a locker plant's ability to survive as a viable and financially successful business. The extent that management can mechanize particular activities, such as packaging, and specialize labor operations such as cutting, boning, and wrapping, depends on volume. Volume reflects the quality of managerial talent the cooperative can

afford. It also determines the cooperative's ability to charge competitive service rates and prices to pay competitive wages.

### Livestock Slaughtered

Slaughtering includes the activities necessary to transform a live animal into carcass form. The service begins when the live animal is transferred from the holding pen to the stunning (knocking) pen and terminates when the freshly slaughtered carcass is placed in the chill cooler.

The average number of cattle slaughtered increased 30 percent between 1960 and 1966, despite a sharp decline during 1962 (table 1).

Table 1.—Livestock: Average number of cattle, hogs, and lambs slaughtered in large plants, by type of account, selected years

Species and year	Livestock slaughtered		
	Total	For patron account	For plant account
----- Number -----			
Cattle:			
1960	2,174	2,127	47
1962	1,872	1,826	46
1964	2,484	2,431	53
1966	2,830	2,785	45
Hogs:			
1960	1,948	1,914	34
1962	1,944	1,905	39
1964	2,387	2,330	57
1966	1,583	1,511	72
Lambs:			
1960	83	83	—
1962	82	82	—
1964	105	105	—
1966	104	104	—

Table 2.—Cattle: Average slaughtered in large plants, by months, 1960 and 1966

Month	Cattle slaughtered in—			
	1960		1966	
	Number	Percent	Number	Percent
January	152	7.0	220	7.8
February	137	6.3	205	7.2
March	171	7.9	221	7.8
April	150	6.9	220	7.8
May	180	8.3	190	6.7
June	232	10.7	251	8.9
July	163	7.5	212	7.5
August	200	9.2	256	9.1
September	219	10.1	239	8.4
October	216	9.9	284	10.0
November	184	8.4	261	9.2
December	170	7.8	271	9.6
Total	2,174	100.0	2,830	100.0
Average	181	8.3	236	8.3

Cooperatives that bought locally raised cattle to be slaughtered, processed, and sold on the plant's account did not promote this activity for the following reasons: (1) demand for locally produced beef was irregular and could not be predicted with any degree of accuracy, (2) a

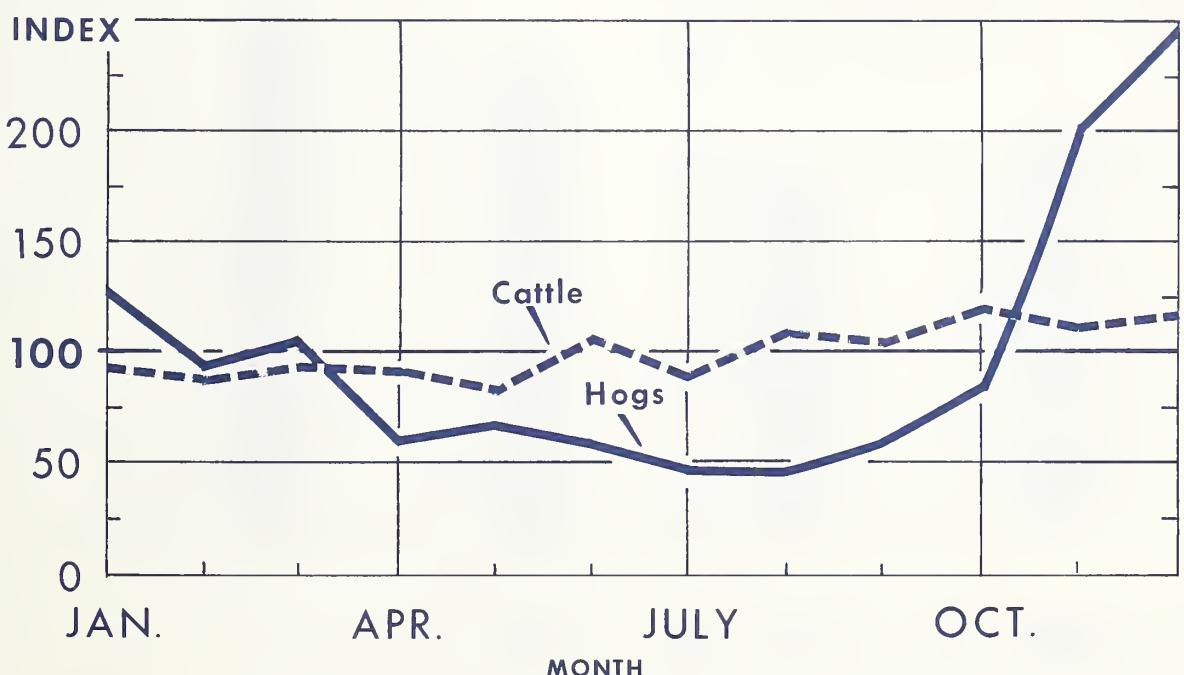
uniform quality of locally produced beef was not available year-round, (3) nonfarm patrons preferred federally graded beef carcasses, and (4) plant managers lacked skill in estimating dollar value of live cattle.

Managers purchased a few locally raised cattle from cooperative members who wanted an additional marketing outlet for specially finished stock, and for patrons who preferred locally produced beef. In 1966, less than 2 percent of the cattle slaughtered by large cooperatives with slaughtering facilities were for resale—a 1-percentage-point decline since 1960.

By 1966, cattle slaughter volume was uniformly distributed over the 12 months, even though it was almost entirely custom volume, over whose scheduling plant managers had little control (table 2 and figure 1).

Hog slaughter volume—between 96 and 98 percent of it was custom work—varied markedly from year to year. Apparently, the number of hogs raised by farmers and slaughtered for their own use reflected price changes. For example, the average price for hogs during 1964 was \$1.75 a cwt. less than the 1962 average price level, and the number of hogs slaughtered increased nearly 25 percent

## FIGURE 1.—SEASONALITY OF CATTLE AND HOGS SLAUGHTERED, LARGE PLANTS, 1966



between these 2 years. In 1966, hog prices averaged \$9.50 a cwt. higher than in 1964, and the number of hogs slaughtered declined more than 30 percent over that period. The nature and limited amount of available data make it impossible to measure statistically this hog-price-custom slaughter relationship.

Farmers who slaughtered hogs on farms formerly scheduled butchering for the winter months, because they lacked mechanical refrigeration. Most farmers now have their hogs custom slaughtered. However, tradition continues to influence farmers' thinking about slaughtering hogs for their own use because January, November, and December were peak volume months in 1966 as they were in 1960 (table 3 and figure 1). Minimizing the seasonality of hog slaughtering volume continued to be a major challenge to cooperatives.

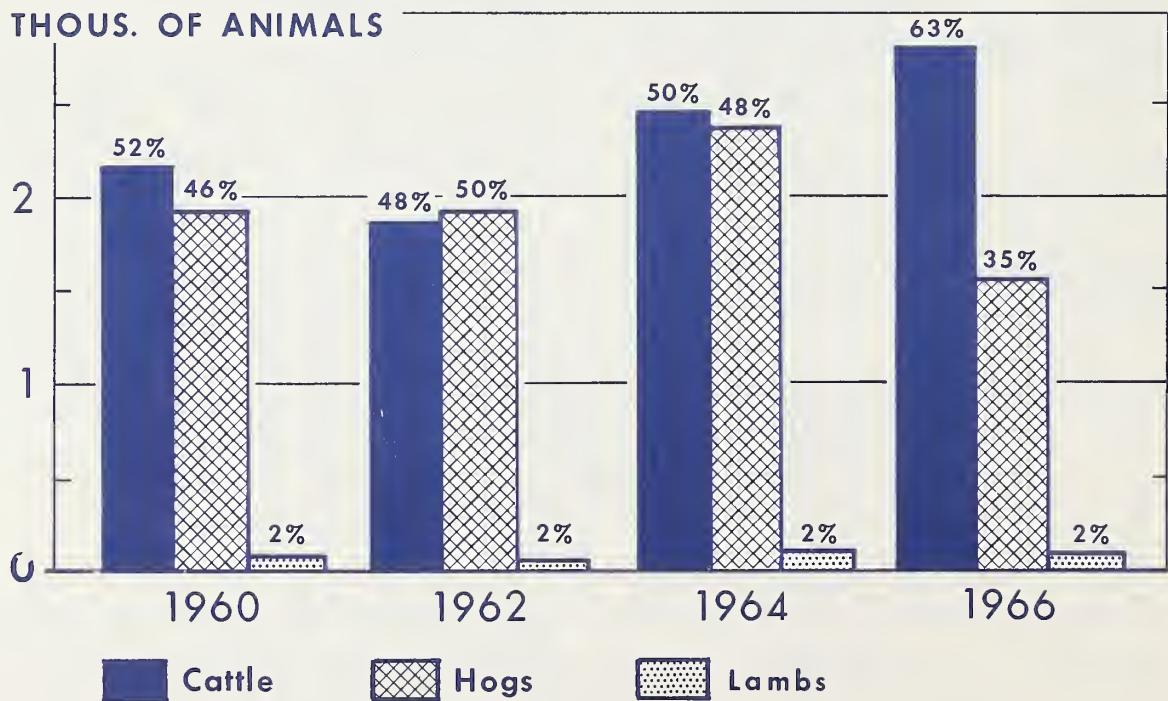
During all four time periods, lambs accounted for 2 percent of total slaughter volume (fig. 2). Cooperatives that slaughtered lambs did so as a service to their member-patrons.

The substitution of one species of livestock for another resulted primarily from relative changes in market prices.

Table 3.—Hogs: Average slaughtered in large plants, by months, 1960 and 1966

Month	Hogs slaughtered in—			
	1960		1966	
	Number	Percent	Number	Percent
January	246	12.7	168	10.7
February	141	7.2	124	7.8
March	118	6.1	140	8.8
April	69	3.5	79	5.0
May	64	3.3	90	5.7
June	52	2.7	79	5.0
July	71	3.6	63	4.0
August	86	4.4	63	4.0
September	125	6.4	78	4.9
October	165	8.5	110	6.9
November	355	18.2	264	16.7
December	456	23.4	325	20.5
Total	1,948	100.0	1,583	100.0
Average	162	8.3	132	8.3

FIGURE 2.—AVERAGE NUMBER OF ANIMALS SLAUGHTERED AND PERCENTAGE DISTRIBUTION BY SPECIES, LARGE PLANTS, SELECTED YEARS



When cattle prices are low relative to hog prices, farmers tend to have cattle custom slaughtered and sell their hogs. Conversely, when hog prices are low, they tend to slaughter hogs and sell their cattle. During 1966, hog prices exceeded cattle prices for the first time in more than a decade, which partially explains the substantial shift from hogs to cattle that year.

The number of cattle slaughtered ranged from 48 to 52 percent of total slaughter volume from 1960 through 1964. By 1966, cattle represented nearly two-thirds of total slaughter volume (fig. 2).

Numerous locker plant operations and custom services have been affected by the substantial shift from hogs to cattle. For instance, greater cattle slaughter volume increased the demand for carcass aging cooler space. Greater beef processing volume increased the demand for sharp-freezer space. The decline in hog slaughter volume reduced the volume of pork for processing, curing, sausage making, and lard rendering.

## Meat Processed

Meat processing, the principle service provided by all large cooperatives studied, includes cutting, trimming, deboning, grinding, tenderizing, packaging, and other activities required to transform a carcass into cuts of meat. It does not include pork curing, lard rendering, or poultry dressing. Processing begins when the carcass or primal cut is taken from the holding cooler<sup>1</sup> and ends when the packaged meat is placed in the sharpfreezer.

On the average, large plants with slaughtering facilities processed more than 800,000 pounds of meat in 1966 (table 4), a 26-percent increase over 1960. Nearly 90 percent of the 166,000-pound increase was custom processed—additional evidence that the cooperatives in this group continued functioning primarily as custom service organizations. During 1966, nine of every 10 pounds of meat handled by these cooperatives was processed on a custom basis, unchanged since 1960.

The total volume of beef processed by large plants with slaughtering facilities increased an average of 180,000 pounds—43 percent—between 1960 and 1966. The total pork processing volume declined 8,000 pounds—approximately 2 percent—in the same period. After a 20-percent decline between 1960 and 1962, pork processing volume increased in 1964 and continued to increase through 1966, although the number of hogs slaughtered declined approximately 33 percent between 1964 and 1966. During 1966, cooperatives in this group apparently

Table 4.—Fresh meat: Average volume processed by kind of meat and type of account, large plants with and without slaughtering facilities, selected years

Year	Meat processed—					
	Total	For patron account			For plant account	
		Beef	Pork	Other <sup>1</sup>	Beef	Pork
----- 1,000 pounds -----						
		With slaughtering facilities				
1960	635	361	201	13	55	5
1962	635	395	164	9	62	5
1964	741	484	181	8	57	11
1966	801	529	183	7	67	15
		Without slaughtering facilities				
1960	595	250	265	5	40	35
1962	546	270	190	10	29	47
1964	582	335	172	5	27	43
1966	629	386	129	5	54	55

<sup>1</sup>Includes wild game and lamb.

processed a greater number of the hogs they custom slaughtered than during earlier years.

As a result of changes in product mix—the shift from pork to beef—beef accounted for 75 percent of the total meat processing volume in 1966, up from 65 percent in 1960.

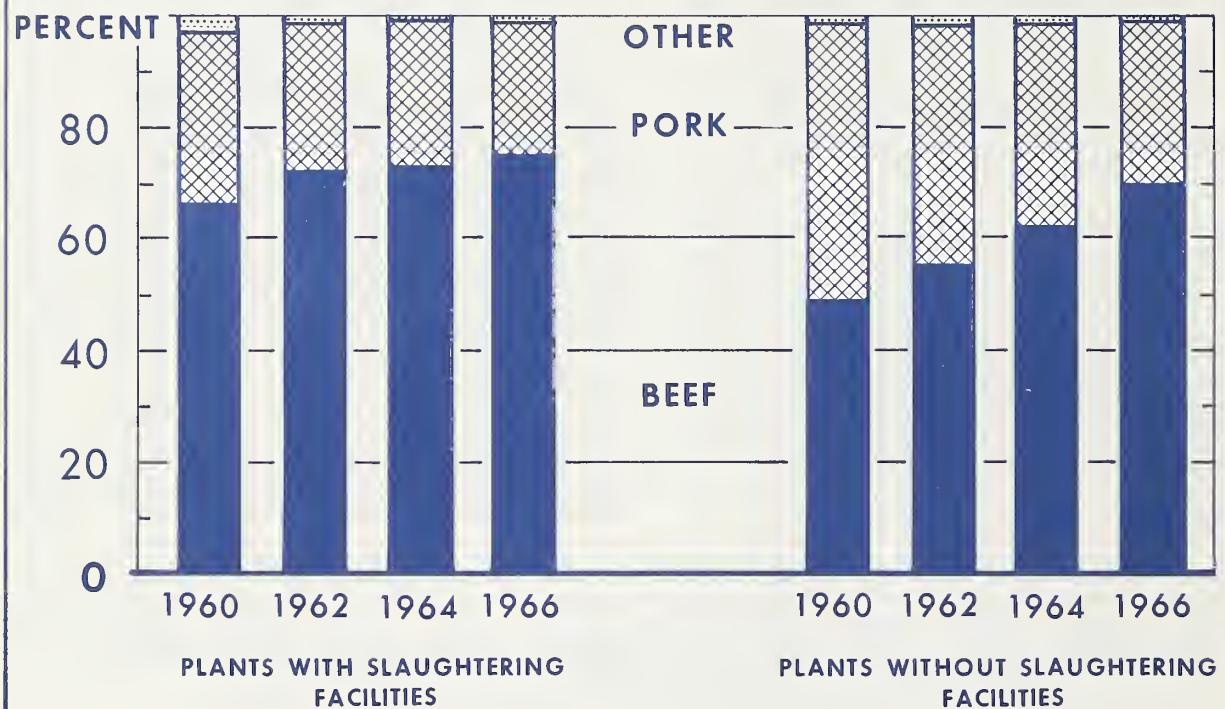
The volume of other meats—primarily venison—processed by large plants with slaughtering facilities declined annually since 1960. These cooperatives are gradually discontinuing processing venison because its volume peaks during December, the same month that processing volume of farmer-owned meat is at or near its peak level.

The large plants without slaughtering facilities processed an average of 629,000 pounds of meat in 1966 (table 4), 6 percent more than in 1960. The 34,000-pound increase in volume of meat processed between 1960 and 1966 by these cooperatives resulted entirely from meat sold on their own accounts. By the end of 1966, 17 percent of the meat processed was on their own account, compared with 12 percent in 1960. This change indicates that these plants began shifting their emphasis from custom service to merchandising. The average volume of meat custom processed by large plants without slaughtering facilities was the same in 1966 as in 1960—520,000 pounds.

Changes in product mix—the substitution of beef for pork—in large plants without slaughtering facilities is evident in figure 3. For example, beef accounted for less than half (49 percent) of total meat processing volume in 1960. By 1966, it increased to 70 percent of that volume.

<sup>1</sup>The holding cooler may be the chill cooler for pork carcasses or the age cooler for beef carcasses and primal cuts of beef.

### FIGURE 3.--CHANGES IN THE MIX OF FRESH MEAT PRODUCTS PROCESSED BY LARGE PLANTS WITH AND WITHOUT SLAUGHTERING FACILITIES, SELECTED YEARS



The average volume of pork custom processed declined more than 50 percent between 1960 and 1966 in large plants without slaughtering facilities. This decline resulted from: (1) fewer farm families that raised hogs for their own consumption; and (2) considerably fewer hogs slaughtered on the farm by families raising hogs (the primary source of hog carcasses processed on a custom basis by plants in this group). Cooperative management can expect the volume of pork custom processed to continue to decline.

#### Pork Cured

Curing begins when pork that has been cut and trimmed is rubbed with a dry curing mixture or is pumped with or soaked in a brine curing mixture and ends when the pork has been smoked. The cured pork then may be deboned, sliced, trimmed, and packaged—all of which are considered processing.

Years ago, farmers brought home-butchered pork to the locker plant for custom curing and smoking. This

supply of pork once accounted for nearly half the locker plant's total curing volume, but in recent years it has nearly disappeared. Today, pork cured by large locker cooperatives with and without slaughtering facilities is derived almost exclusively from fresh pork processed by them or from selected cuts purchased from other packers for further processing and resale.

Total volume of pork cured by the large plants with slaughtering facilities declined an average of 50 percent—more than 50,000 pounds—between 1960 and 1962, then fluctuated slightly between 1962 and 1966 (table 5). These cooperatives also cured considerably less pork relative to their total pork processing volume—a decline from 53 percent in 1960 to 30 percent in 1966. The major portion of the decline resulted from fewer hogs slaughtered on the farm, which in turn reduced the amount of pork brought to the plant for custom curing.

The large plants with slaughtering facilities increased the volume of pork cured on their own accounts for resale from less than 2 percent of total volume in 1960 to nearly 12 percent by 1966. However, on the average that sub-

Table 5.—Cured pork: Average volume cured in large plants with and without slaughtering facilities, by type of account, selected years

Year	Pork cured by plants—					
	With slaughtering facilities			Without slaughtering facilities		
	Total	Patron acct.	Plant acct.	Total	Patron acct.	Plant acct.
----- 1,000 pounds -----						
1960	109	107	2	74	61	13
1962	62	59	3	64	44	20
1964	68	63	5	61	39	22
1966	61	54	7	72	36	36

stantial relative increase represented only 5,000 pounds of products. These cooperatives continued to emphasize the custom curing service and did not promote the sales of cured products. They sold cured pork products only to the extent that patrons came to the plants wanting to buy them.

The large plants without slaughtering facilities reported a 20-percent (13,000 pound) decline in average pork curing volume during the first three time periods studied. The increased volume of pork cured on their own accounts through 1964 was not sufficient to offset the decline in volumes custom cured (table 5).

Despite the declining curing volume, cooperatives without slaughtering facilities developed meat merchandising programs for cured products. By 1966, they had successfully reversed the downward trend. However, between 1960 and 1966, a major shift had developed. For example, during 1960 only 18 percent of the total curing volume was sold on the cooperatives' accounts. By 1966, 50 percent of the total curing volume was merchandised on their accounts.

### Sausage Made

The large plants with and without slaughtering facilities generally included the cost of making sausage on a custom basis in the fees charged for custom processing. However, plant managers maintained separate records on the amount of sausage products made.

All large plants in both groups made sausage on a custom basis for farmers, and all but one plant made sausage for sale on its own account. Two cooperatives, both without slaughtering facilities, prepared sausage products from as many as a dozen different formulas. The others used between 3 and 6 formulas. In addition to the familiar country-style, links, and bulk (patty) sausage products, the formulas included other pork products such as bologna, wieners, summer sausage, and scrapple.

Table 6 shows that the average volume of sausage made by large plants with and without slaughtering facilities increased between 1960 and 1966. The typical plant in the latter group increased its sausage volume at a substantially faster rate than plants in the first group—a 50-percent increase representing nearly 10,000 pounds of product, compared with a 13-percent increase representing less than 2,000 pounds.

During 1960, about 7 percent of the total pork processing volume was further processed into sausage products by plants in both groups, a percentage level that suggests that only pork trimmings were used to make sausage.

Between 1960 and 1966 the large plants with slaughtering facilities further processed approximately 8 percent of their pork processing volume into sausage. This suggests that they continued making sausage primarily as a custom service.

Table 6.—Sausage products: Average amount made, in large plants with and without slaughtering facilities, selected years

Year	Sausage products made by plants—	
	With slaughtering facilities	Without slaughtering facilities
----- Pounds -----		
1960	14,400	18,950
1962	13,500	21,250
1964	15,700	24,700
1966	16,200	28,400

The large plants without slaughtering facilities, on the other hand, used more than 15 percent of their pork processing volume to make sausage products in 1966. In addition to making sausage on a custom basis from pork trimmings, they bought lean pork cuts—shoulders, boston butts, etc.—from other meatpackers to make sausage for sale on their own accounts. This substantial increase, a percentage level that more than doubled between 1960 and 1966, suggests that merchandising sausage became an increasingly more important activity to these cooperatives.

## Lard Rendered

Rendering lard, an important custom service, complements the meat processing service. The large cooperatives in this study used open-kettle rendering, because this method usually produces a higher quality product than other methods. Approximately 30 pounds—20 percent—of a typical 150-pound pork carcass is trimmable fat that can be rendered into lard.

rendered relative to volume of pork processed remained unchanged at approximately 20 percent between 1960 and 1966. These cooperatives sold lard to drive-in restaurants and public institutions to be used in cooking.

## Poultry Dressed

As the number of small poultry flocks dwindled in recent years, so did the volume of poultry custom dressed for farmers. Between 1960 and 1966, the average volume of poultry dressed by large plants with slaughtering facilities declined approximately 40 percent, representing more than 10,000 pounds of product (table 7). During 1966, as in earlier years, these cooperatives did not buy any poultry for resale. They continued to offer a custom poultry dressing service because some patrons still needed the service, and because poultry volume peaked in June and July, normally a slack period in plant operations.

The volume of poultry dressed—all custom—by the large plants without slaughtering facilities declined between

Table 7.—Other products: Average volume of lard rendered and poultry dressed in large plants with and without slaughtering facilities, selected years

Year	Other products handled by plants—			
	With slaughtering facilities		Without slaughtering facilities	
	Lard <sup>1</sup>	Poultry	Lard <sup>1</sup>	Poultry
Pounds				
1960	38,250	25,750	57,975	17,150
1962	27,900	22,800	52,925	13,725
1964	31,150	18,500	45,550	14,175
1966	24,950	14,975	38,550	17,550

<sup>1</sup>Weights are based on unrendered pork fat.

The average volume of lard rendered by the large plants with slaughtering facilities declined 35 percent between 1960 and 1966 (table 7). Moreover, the lard volume declined relatively faster than the pork processing volume. In 1960, for instance, 20 percent of the total pork processing volume was rendered into lard, compared with less than 13 percent in 1966. That 7-percentage-point decline resulted from three factors: (1) hogs produced in 1966 generally had a higher lean-to-fat ratio than those produced in 1960; (2) farm families used less lard than in earlier years; and (3) very little, if any, fat from pork carcasses bought on the plant account was rendered into lard for resale.

The average volume of lard rendered by the large plants without slaughtering facilities also declined 35 percent between 1960 and 1966. However, the amount of fat

1960 and 1962. Around 1964, cooperatives in this group included poultry in their merchandising activities. By 1966, they dressed a slightly larger volume of poultry than in 1960 and 25 percent more than in 1962, their low-volume year.

## Refrigerated Facilities

The large plants maintained similar refrigeration capacities in 1966—approximately 36,000 cubic feet per plant. The physical size of special-purpose refrigerated rooms—chill and age coolers, sharpfreezer, cold storage freezer, and cure cooler—varied considerably between the two types of operations (table 8).

The large plants with slaughtering facilities remodeled their refrigerated facilities between 1960 and 1966 to

Table 8.—Refrigerated facilities: Average volume of specific rooms in large plants with and without slaughtering facilities, 1960 and 1966

Type of room	Volume of refrigerated space in plants—			
	With slaughtering facilities		Without slaughtering facilities	
	1960	1966	1960	1966
. . . . . <i>Cubic feet</i> . . . . .				
Chill cooler	3,985	4,390	2,960	2,960
Age cooler	6,040	6,240	4,650	4,650
Sharpfreezer	1,355	2,120	1,715	1,715
Cold storage freezer	16,070	15,110	20,145	20,145
Cure cooler	6,440	6,440	6,560	6,560
Other <sup>1</sup>	1,470	1,470	—	—
Total	35,360	35,770	36,030	36,030

<sup>1</sup>Rooms used to store dairy products, eggs, and fresh fruits and vegetables.

improve operational efficiency, handle a larger volume of products, and improve member services. The large plants without slaughtering facilities, on the other hand, did not change the capacity of their refrigerated rooms during the four periods studied.

### Chill Cooler

The primary purpose of the chill cooler is to lower the temperature of freshly slaughtered carcasses. But all locker plants, whether they slaughter livestock or not, have chill coolers. As a general practice, every carcass is placed in the chill cooler at least a day before it is aged or processed. The chill cooler usually has a high rate of product turnover, often as many as five turnovers a week during peak volume months.

On the average, the large plants with slaughtering facilities had nearly 50 percent more chill cooler space than the large plants without slaughtering facilities in 1966. This difference in cooler capacities might be expected for two reasons: (1) Demand for chill cooler space was greater for plants that slaughtered livestock than for plants that received carcasses already dressed and chilled; and (2) plants that slaughtered livestock were larger volume operations. During 1966, for instance, they handled nearly 30 percent more products than plants that didn't slaughter livestock.

### Age Cooler

All the large locker cooperatives routinely aged beef carcasses in an environment with controlled temperature and humidity for periods ranging from 10 days to 2 weeks.

In 1966, the large plants with slaughtering facilities had an average of one-third more beef-carcass aging capacity than the large plants without slaughtering facilities. Great-

er age-cooler capacity was needed by the plants in the first group because they processed about 35 percent more beef than plants in the second group.

### Sharpfreezer

Frozen food locker plants sharp freeze nearly every pound of meat they process. The physical size of the sharpfreezer room, the seasonal pattern of processing volume, and the rate of product turnover in the sharpfreezer determine the plant's shortrun output capacity. In 1960 the physical size of the sharpfreezer was the most serious production bottleneck and the major restraint to growth among large cooperatives with slaughtering facilities. Between 1960 and 1966, these plants increased their sharpfreezers' physical capacities by more than 55 percent chiefly to eliminate that bottleneck and to handle a larger volume of meat. By the end of 1966, the large plants with slaughtering facilities had an average of 25 percent more sharpfreezer capacity than the large plants without slaughtering facilities.

### Cold Storage Freezer

The cold storage freezer, once used almost exclusively as a locker room, became increasingly more important as bulk piling space. A greater proportion of the meat processed by the large plants during 1966, compared with 1960, was temporarily piled in the cold storage freezer awaiting pickup by homefreezer owners. Large cooperatives removed some unrented lockers from the cold storage freezer to make additional bulk piling and storage space available.

On the average, the large plants with slaughtering facilities had 25-percent less cold storage space in 1966 than the large plants without slaughtering facilities—15,000 and

20,000 cubic feet, respectively. Cooperatives that remodeled their plants actually reduced the size of their cold storage freezers. That space was needed for other functions, especially carcass chilling and aging.

## Cure Cooler

The cure coolers in all large plants, except one, were especially designed, equipped, and maintained for that function, which precluded their use as multipurpose coolers during months of low curing volume. Since pork curing, like hog slaughtering, is highly seasonal, the cure room capacity was idle several months each year. The large plants with and without slaughtering facilities had similar pork curing capacities in 1966, unchanged since 1960.

## Rates

A locker cooperative's rates for services were determined by several factors, including: competitors' rates charged for similar services; the cooperative's cost structure; the manager's "feel," based on his experience; and the cooperative's rate policy, based on the board's interpretation of the organization's objectives.

Both groups of large plants maintained steady locker rental rates between 1960 and 1966 (table 9). The demand for lockers was probably influenced more by the type of services provided than by rental rate. For instance, large plants that slaughtered livestock charged higher rental rates yet rented a greater number of available lockers (table 15).

Rates charged for custom slaughtering cattle included a cash fee and the value of the beef hide. Lower

commercial value for beef hides and rising operating costs caused cooperatives to increase the cash portion of the cattle slaughtering rate from \$2.70 per animal in 1960-64 to \$2.90 in 1966. Rates for custom slaughtering of hogs remained at \$2 per animal between 1960 and 1964, but increased to \$2.25 in 1966.

The large cooperatives with slaughtering facilities increased fees for custom processing beef and pork an average of 50 cents a 100 pounds of product between 1960 and 1966. During that same period, the large cooperatives without slaughtering facilities increased custom processing fees by \$1 a 100 pounds of beef and by 80 cents a 100 pounds of pork.

Custom rates for the pork curing service provided by the large plants with and without slaughtering facilities increased by 75 cents and \$1.40 per 100 pounds of pork cured, between 1960 and 1966.

During 1966, the large plants with slaughtering facilities charged lower rates for all custom services than the large plants without slaughtering facilities.

## Employment

The large cooperatives used several methods to supplement their regular full-time staffs. Some used part-time labor—employees working 20 to 25 hours a week. Some used seasonal labor—employees working 40-hour weeks for a 15 to 20-week period. And others used overtime—full-time employees working more than a 40-hour week. Because of these variations, the total number of hours worked at each cooperative were converted to a man-

Table 9.—Rates: Averages charged for specific services in large plants with and without slaughtering facilities, July 1, 1960 and 1966

Service	Rates charged by plants—			
	With slaughtering facilities		Without slaughtering facilities	
	1960	1966	1960	1966
<i>Dollars</i>				
Locker renting, per year	14.40	14.40	13.20	13.45
Slaughtering, per head of:				
Cattle	15.90	16.40	— <sup>2</sup>	— <sup>2</sup>
Hogs	2.00	2.25	— <sup>2</sup>	— <sup>2</sup>
Processing, per cwt. of:				
Beef	5.15	5.65	4.80	5.80
Pork	4.50	5.00	4.70	5.50
Curing, per cwt.	5.00	5.75	6.40	7.80

<sup>1</sup>Includes cash and the value of the hide.

<sup>2</sup>These plants do not provide this service.

year basis to make data from all plants comparable. One man-year is equivalent to 2,080 hours, or 52 40-hour weeks. An employee that worked a 44-hour week year-round was considered 1.1 man-years. Similarly, an employee that worked a 20-hour workweek year-round was considered 0.5 man-year.

On the average, large plants with slaughtering facilities used 12.6 man-years of labor in 1966, about the same as during 1960 (table 10). Plants in this group used fewer man-years during 1962, primarily because of declines in number of cattle slaughtered and pounds of pork cured. Slaughter volume increased again in 1964, and the employment level also increased.

Processing accounted for nearly half the total man-years used by the large plants with slaughtering facilities. Slaughtering was the second most important activity. Since pork curing was seasonal and did not require the full time of an employee, time devoted to curing generally was provided by a "swing" man. The small amount of time devoted to sales usually came from meat

the total man-years used by these plants, which indicates the importance of this activity.

Although curing volume declined during the first three time periods, the large cooperatives without slaughtering facilities allocated an increasing amount of time to pork curing. The additional time was used to perform specialty work that was part of these cooperatives' merchandising programs.

Time devoted to administration by the large cooperatives without slaughtering facilities remained stable at 2.2 man-years between 1960 and 1966, except for a slight decline during 1962.

Both groups of large cooperatives are striving for programs that require a regular staff working a 40-hour week year-round because (1) improved processing equipment requires highly trained personnel; (2) production volume, the major portion of which is cattle slaughtering and beef processing, has become more uniformly distributed throughout the year; and (3) part-time, seasonal

Table 10.—Man-years: Average number used, large plants with and without slaughtering facilities, selected years<sup>1</sup>

Function	Man-years used by plants—							
	With slaughtering facilities				Without slaughtering facilities			
	1960	1962	1964	1966	1960	1962	1964	1966
Man-years								
Slaughtering <sup>2</sup>	3.4	3.2	3.5	3.7	—	—	—	—
Processing	5.9	5.4	5.5	5.7	5.2	4.4	4.4	4.5
Curing	1.1	.8	.8	.6	.6	.6	.7	.7
Sales	.1	.1	.1	.1	.6	.4	.8	.8
Administration	2.0	2.0	2.0	2.5	2.2	2.1	2.2	2.2
Other <sup>3</sup>	—	—	—	—	.4	.3	.3	.1
Total	12.5	11.5	11.9	12.6	9.0	7.8	8.4	8.3

<sup>1</sup>1 man-year equals 2,080 hours (52 40-hour weeks).

<sup>2</sup>Includes poultry eviscerating for plants with slaughtering facilities.

<sup>3</sup>Includes poultry eviscerating for plants without slaughtering facilities.

processing employees who would interrupt that activity long enough to serve customers. The administrative function, which included the manager and the book-keeper, became increasingly more important during 1966, primarily because of increasing volume.

The large plants without slaughtering facilities used slightly fewer man-years in 1966 than in 1960. Like plants with slaughtering facilities, these plants also experienced a lower volume of output—especially meat processing volume—during 1962, which accounted for their lowest employment level during the four periods studied. Meat processing accounted for more than half

or overtime labor increases unit production costs and lowers labor productivity.

## Patrons

Farm families generally patronize their locker cooperative for the custom services it provides. Nonfarm families do so primarily for the products it sells. Furthermore, farm families usually have larger quantities of meat processed by the cooperative than nonfarm families. For instance, a farm family will have a quarter, side, or

Table 11.—Patrons: Average number served by large plants, with and without slaughtering facilities, selected years

Year	Patrons served by plants—					
	With slaughtering facilities			Without slaughtering facilities		
	Total	Farmer	Nonfarmer	Total	Farmer	Nonfarmer
<i>Number</i>						
1960	2,050	1,625	425	2,395	2,109	286
1962	2,023	1,625	398	2,309	1,905	404
1964	2,269	1,788	481	2,397	1,876	521
1966	2,287	1,731	556	2,949	1,963	986

whole beef carcass weighing between 150 to 600 pounds processed at one time, whereas a nonfarm family will buy a beef primal cut—round, loin, rib, or chuck—weighing 25 to 75 pounds and have that smaller quantity processed at one time.

During 1960, 80 percent of the patrons served by the large plants with slaughtering facilities were farm families (table 11). Managers indicated that around 1964 many farmers anticipated price control and quantity rationing programs because of increased military activity in Southeast Asia. Therefore, an increasing number of farmers began patronizing their locker cooperatives during 1964 to take advantage of the provisions such rationing and control programs might provide families who produce food for their own use. The programs did not materialize so farm patronage declined slightly again in 1966. The number of nonfarm patrons served by the large plants with slaughtering facilities declined slightly in 1962 over the 1960 level, but increased in 1964 and again in 1966. The average number of patrons served by large plants with slaughtering facilities in 1966 increased 10 percent over 1960. Farm patronage still accounted for more than three-fourths of total patronage.

The average number of patrons served by large plants without slaughtering facilities increased by 25 percent between 1960 and 1966. Moreover, a substantial shift from farm to nonfarm patronage occurred. During 1960, 88 percent of the nearly 2,400 patrons were farmers. By 1966, only two-thirds of the 2,950 patrons were farmers. The increased number of patrons served as well as the shift from farm to nonfarm patronage can be attributed primarily to meat merchandising programs these cooperatives developed around 1964.

Large plants with slaughtering facilities served an average of five wholesale customers—grocery stores and meat markets—and eight institutional customers—schools, hospitals, restaurants, etc.—in 1966, unchanged since 1960. On the average, large plants without slaugh-

tering facilities served only one wholesale customer in 1966, also unchanged since 1960. But they served an average of five institutional accounts, an increase of two over the four time periods. Wholesale and institutional transactions accounted for an extremely small portion of total sales or physical volume of product handled by cooperatives in both groups.

Some locker cooperatives solicited wholesale and institutional accounts, especially restaurants and drive-in hamburger stands, because they add physical volume during normally low-volume months. Other locker cooperatives had all the business they could possibly handle from their members and other individual (family) patrons so they attempted to discontinue serving wholesale and institutional accounts.

## Meat Processed Per Patron

Large plants with slaughtering facilities processed 55 percent more meat per patron in 1966 than large plants without slaughtering facilities (table 12). A substantial portion of this greater volume can be attributed to the custom slaughtering that service cooperatives provided their farm patrons. For instance, the owner of an animal that was custom slaughtered at the locker plant usually had the entire carcass custom processed. On the other hand, the farmer who butchered an animal on the farm because a custom slaughtering service was not available, frequently did so on a slaughtering basis—as it is termed in some areas—and shared the carcass with those who helped in the slaughtering. The locker plant usually received only a portion of the home-butchered carcass for custom processing.

Total volume of meat processed per patron by large plants with slaughtering facilities remained fairly steady between 1960 and 1966, whereas the volume processed by large plants without slaughtering facilities declined approximately 15 percent during the same time.

Table 12.—Meat processed per patron: Average volume in large plants with and without slaughtering facilities, selected years

Year	Volume of meat processed per patron by large plants										
	Total	Beef	Pork			Poultry	Other <sup>1</sup>				
			Fresh	Cured	Sausage						
----- <i>Pounds</i> -----											
<i>With slaughtering facilities</i>											
1960	382	203	100	53	7	13	6				
1962	364	226	84	31	7	11	5				
1964	371	238	85	30	7	8	3				
1966	391	261	87	27	7	6	3				
<i>Without slaughtering facilities</i>											
1960	294	121	125	31	8	7	2				
1962	278	129	103	27	9	6	4				
1964	284	151	90	25	10	6	2				
1966	253	149	62	24	10	6	2				

<sup>1</sup>Includes lamb and wild game.

The volume of beef processed per patron increased by 58 and 28 pounds (30 and 25 percent) in large plants with and without slaughtering facilities between 1960 and 1966. The volume of fresh pork processed per patron declined between 1960 and 1966, but at substantially different rates—an average of 13 pounds in plants with slaughtering facilities, compared with 63 pounds in plants without. Large plants with slaughtering facilities processed an average of 25 more pounds of fresh pork per patron in 1966 than large plants without slaughtering facilities. Seven years earlier the reverse was true. Apparently, many farmers are willing to have pork custom processed if the locker plant also provides slaughtering and other related services. However, they are no longer willing to slaughter hogs on the farm and take the dressed carcasses to the locker plant for custom processing.

There is no apparent reason for the 50-percent decline in amount of pork cured per patron by the large plants with slaughtering facilities, most of which occurred between 1960 and 1962. The volume cured by these cooperatives in 1960 might possibly be an atypical situation. The amount of pork cured per patron by large plants without slaughtering facilities also declined between 1960 and 1966, but by 20 percent.

The amount of sausage made by large plants with slaughtering facilities remained unchanged at 7 pounds per patron between 1960 and 1966. The large plants without slaughtering facilities increased sausage volume from an average of 8 pounds per patron in 1960 to 10 pounds in 1966. Considering the general declines in volume of fresh and cured pork products handled, the higher pork sausage volume among plants without

slaughtering facilities reflect the success of their sausage merchandising efforts.

The volume of poultry processed per patron by large plants with slaughtering facilities declined more than 50 percent over the four time periods. Very little change occurred in the amount of poultry processed per patron by the average large plant without a slaughtering facility during the four time periods.

The preceding analysis suggests possible direction of business growth for both groups of large plants. The large locker cooperatives with slaughtering facilities might consider the following three-phase expansion program: (1) Serve a greater number of patrons by penetrating the present trade area more intensively with present services and products—a membership drive might produce the desired results; (2) produce a wider variety of meat products, especially cured hams and sausage items, and merchandise them to present patrons in present trade area; and (3) extend present trade area with the service and products already available including those developed in phase two.

Large locker cooperatives without slaughtering facilities need to serve present patrons more intensively with present services and products. These cooperatives can probably sell an additional 75 pounds of beef and 25 pounds of fresh pork each year per patron through more intensive merchandising efforts. They should consider offering new services, such as livestock slaughtering, and selling a wider variety of meat products. Finally, they should extend their business trade area boundaries.

## Efficiency

The productivity of labor and the extent to which refrigerated facilities have been used are the two efficiency measures most important to locker plant management. The relative net gain on total revenue with respect to the cooperative's objective, together with the above two measures of operating efficiency, reflect the efficiency of management.

### Labor Productivity

A useful measure of abattoir labor productivity could not be developed from the limited number of observations in this study. Lack of a suitable statistical base resulted from an interaction of several factors including (1) the same labor force was used to slaughter all species of livestock (2) more time was required to slaughter a beef animal than a hog (3) substantial shifts between hogs and cattle occurred between one time period and the next and (4) hog slaughtering procedures varied markedly among the large plants.

Pork curing labor productivity could not be calculated, either because of the limited number of observations or variation in curing procedures—dry rub versus brine soaked or pumped. Each procedure requires substantially different amounts of time to cure a given quantity of pork.

Meat processing is fairly standardized in all the large cooperatives. Therefore, it is the only activity for which labor productivity was calculated and analyzed.

Large plants with and without slaughtering facilities operated at similar levels of meat processing labor productivity (table 13). On the average, meat processing employees in large plants with slaughtering facilities were 3 percent less productive than large plants without slaugh-

tering facilities in 1960. By 1962 they became slightly more productive and by 1966 were 5 percent more efficient than in plants without slaughtering facilities.

Generally, large cooperatives with slaughtering facilities purchased new high-capacity processing equipment and changed product flow to achieve the 30-percent improvement in labor productivity between 1960 and 1966. Managers of large cooperatives without slaughtering facilities adjusted crew size to workload and scheduled employees to begin work at different times to achieve the 20-percent improvement in labor productivity over the four time periods.

### Use of Refrigerated Facilities

The volume of product handled per cubic foot of refrigerated space for a given time period indicates how effectively locker cooperatives use their facilities.

*Chill Cooler.*—Use of chill cooler space increased 12 percent in large plants with and 5 percent in plants without slaughtering facilities between 1960 and 1966 (table 14).

On the average, large plants with slaughtering facilities used their chill cooler space 20 percent less effectively during 1960 and 15 percent less effectively during 1966 than large plants without slaughtering facilities. This difference might be expected, since freshly slaughtered carcasses need more space and a longer time in the chill cooler than carcasses already chilled.

If one considers the relationship between product mix (3 pounds of beef to 1 pound of pork) and product turnover (1 to 3 days in the chill cooler for beef and pork and an additional 10 to 14 days in the age cooler for beef) then analysis of data in table 14 suggests that large plants could handle approximately 500 pounds of carcass meat a year per cubic foot of chill cooler space. On this basis, large plants used their chill cooler space at approximately 35 to 40 percent of potential capacity in 1966.

*Age Cooler.*—Age cooler efficiency was computed only on the volume of beef processed, since pork carcasses are not aged. Large plants with slaughtering facilities increased their age cooler efficiency an average of 36 percent, and those without slaughtering facilities, nearly 60 percent in the four periods. By the end of 1966, both groups of plants used their age coolers equally—95 pounds of beef a year per cubic foot of space. Plant

Table 13.—Labor productivity: Average volume of meat processed per man-year allocated to processing, large plants with and without slaughtering facilities, selected years<sup>1</sup>

Year	Volume of meat processed per man-year by large plants—	
	With slaughtering facilities	Without slaughtering facilities
<i>Pounds</i>		
1960	108,130	111,665
1962	119,025	117,200
1964	135,600	125,545
1966	140,895	133,930

<sup>1</sup> 1 man-year equals 2,080 hours (52 40-hour weeks).

Table 14.—Use of facilities: Average annual volume of meat passing through specific types of refrigerated rooms, large plants with and without slaughtering facilities, 1960 and 1966

Type of facility and product	Use of refrigerated rooms by plants—			
	With slaughtering facilities		Without slaughtering facilities	
	1960	1966	1960	1966
. . . . . Pounds per cubic foot . . . . .				
Chill cooler; meat	160	180	200	210
Age cooler; beef	70	95	60	95
Sharpfreezer; meat	470	380	345	365
Cold storage freezer; meat	40	55	30	30
Cure cooler; pork	15	10	10	10

managers indicated that this efficiency level represents the maximum volume of beef that can be aged with present techniques.

The major restraint to future growth for both groups of large plants appears to be the physical capacity of their carcass age coolers because (1) age cooler space was used as efficiently as possible since beef carcasses were received at the plant at a fairly uniform year-round rate; (2) beef carcasses continued to be aged at least 10 days; and (3) beef, relative to total volume of product handled, became increasingly important.

*Sharpfreezer.*—In 1960, large plants with slaughtering facilities processed a third more meat per cubic foot of sharpfreezer space than those without such facilities (table 14). By the end of 1966, the use of sharpfreezer space by the two groups was more nearly even—380 and 365 pounds of meat.

The physical size of the sharpfreezers in large cooperatives with slaughtering facilities was increased more than 55 percent between 1960 and 1966, while total volume of meat processed increased approximately 25 percent. The 20-percent decline—from 470 pounds in 1960 to 380 pounds in 1966—in the use of sharpfreezer space by these plants occurred because the potential capacity of the expanded sharpfreezer facilities had not yet been achieved by the end of 1966. Large cooperatives without slaughtering facilities reported a 6-percent average increase in their sharpfreezer efficiency level between 1960 and 1966.

*Cold Storage Freezer.*—Large cooperatives with slaughtering facilities had 25 percent less cold storage space, but they used it more efficiently than those without slaughtering facilities. They processed a greater volume of meat per cubic foot of cold storage space, rented more food storage lockers, and derived more rental income from that space.

On the average, large plants with slaughtering facilities increased the volume of meat processed per cubic foot of cold storage space by nearly 40 percent between 1960 and 1966. This resulted from a 25-percent increase in total meat processing volume, a 6-percent decline in available cold storage space, and an increase in product turnover from 2-2/3 times a year in 1960 to 3-2/3 times a year in 1966. Large plants without slaughtering facilities processed an average of 30 pounds of meat per cubic foot of cold storage space in 1966, generally the same as 1960.

Based on volume of products handled, large plants with slaughtering facilities used their cold storage space nearly twice as effectively in 1966 as the large cooperatives without slaughtering facilities.

During 1960, large plants with and without slaughtering facilities had a similar average number of lockers available to rent—955 and 930 lockers (table 15). Those with slaughtering facilities rented an average of 84 percent of their lockers while plants in the other group rented an average of 70 percent.

Between 1960 and 1966, large plants with slaughtering facilities removed 11 percent of their lockers, but rented nearly as many in 1966 as in 1960. Large plants without slaughtering facilities removed nearly 30 percent of their lockers, but the number rented declined by 25 percent between 1960 and 1966.

Income from renting cold storage space, a third measure of how effectively this space was used, is discussed under the heading, Receipts from Services.

*Cure Cooler.*—Large plants with and without slaughtering facilities cured approximately 10 pounds of pork per cubic foot of cure cooler space during 1966.

Table 15.—Use of facilities: Average number of lockers available to rent, rented, and percentage rented of total available, large plants with and without slaughtering facilities, selected years

Year	Lockers in large plants—					
	With slaughtering facilities			Without slaughtering facilities		
	Available to rent	Rented	Percentage rented of total available	Available to rent	Rented	Percentage rented of total available
	Number	Number	Percent	Number	Number	Percent
1960	955	798	84	930	655	70
1962	863	799	93	730	576	79
1964	863	773	90	675	534	79
1966	846	794	94	666	494	74

A cure cooler efficiency factor for general application to all locker cooperatives could not be developed because of variability in rates of product turnover and curing methods used. For instance, plants that use a dry cure process may have a ham in some phase of curing as long as a year; whereas, plants that use a brine cure process may have a ham in cure for less than 1 week. Since pork curing volume followed a seasonal pattern similar to hog slaughtering and pork processing, much of the potential cure cooler capacity in both groups of plants was idle several months each year.

## Income and Expenses

Frozen food locker cooperatives derive their operating revenues from the sale of products and from services. Differences in sources of revenues reflect differences in operating programs of plants with and without slaughtering facilities.

### Margins on Product Sales

Margins on meat sale prices were computed before processing fees were added. Margins were also in addition to the processing fees. All large cooperatives maintained uniform retail prices for sides and quarters of beef and pork carcasses from one time period to the next, although wholesale prices for beef and pork changed frequently. Such a price policy resulted in fluctuating percentage margins from meat sales as the following tabulation shows:

Year	Large plants with slaughtering facilities Percent	Large plants without slaughtering facilities Percent
1960	14.3	9.3
1962	10.9	10.5
1964	16.5	11.4
1966	11.3	8.8

On the average, large plants with slaughtering facilities charged lower custom service rates but received a higher percentage margin on meat sales than large plants without slaughtering facilities. This particular rate-price policy, unchanged since 1960, favored custom service patrons (primarily farm families) over customers who bought meat (usually nonfarm families). Large plants without slaughtering facilities changed their service rate-product price policies between 1960 and 1966 to strengthen their merchandising programs. This change favored customers that bought meat over patrons that needed custom services.

When processing fee and markup<sup>2</sup> were added to wholesale price, a side of beef purchased from the plant with a slaughtering facility cost the customer approximately 1 cent more a pound than the same carcass purchased from the plant without a slaughtering facility.

During 1966, an average of 32 percent of total margins from products sold by large plants with slaughtering facilities was from meat sales, a 3-percentage-point decline since 1960 (table 16). Fluctuating percentage margins rather than changing physical volume of meat sold explain most of the variations in dollar revenue from meat sales from one time period to the next.

Sale of commercially packed frozen foods, groceries, and other merchandise accounted for only 4 percent—approximately \$500 annually—of total margins in plants with slaughtering facilities, generally unchanged over the 4 time periods. Plant managers indicated that they perform low-volume sales activities, primarily selling freezer supplies as a patron service—but their boards of directors plan to phase out these activities.

<sup>2</sup>Markup is based on the cost of the product whereas margin is computed from the sales price of the product.

Table 16.—Revenue: Average margins from products sold in large plants with and without slaughtering facilities, selected years

Product	Margins from products sold by large plants in—							
	1960		1962		1964		1966	
	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
<i>With slaughtering facilities</i>								
Meat	4,267	35	3,701	30	5,629	43	4,702	32
Merchandise	492	4	583	4	539	4	490	4
Byproducts	7,501	61	8,236	66	6,872	53	9,648	64
Total	12,260	100	12,520	100	13,040	100	14,840	100
<i>Without slaughtering facilities</i>								
Meat	4,542	79	4,842	79	5,400	83	6,913	59
Merchandise	915	15	753	12	720	11	3,569	31
Byproducts	327	6	571	9	375	6	1,174	10
Total	5,784	100	6,166	100	6,495	100	11,656	100

Byproducts, primarily beef hides, accounted for 64 percent of total sales margins in large plants with slaughtering facilities during 1966, a 3-percentage-point increase since 1960.

A typical 70-pound uncured and ungraded beef hide sold for approximately \$3.25 in 1960 and \$4.50 in 1962, but the price declined to \$2.75 in 1964. To reverse this downward trend, the cooperatives constructed hide curing facilities during 1965 which enabled them to cure and hold hides through a low market and sell large quantities when prices became more favorable. Cured hides could also be sold at higher prices on a weight-grade basis than on an uncured, ungraded basis. These improvements helped increase hide values to \$3.50 each during 1966. The higher hide value also allowed them to keep the cash portion of the custom slaughtering fee lower than would otherwise have been possible.

The large plants without slaughtering facilities increased their revenue from meat sales by more than 50 percent—from \$4,500 in 1960 to \$6,900 in 1966. However, relative to total sales, margins on meat sales declined 20 percentage points over the four time periods.

Three of the five large cooperatives without slaughtering facilities added grocery departments to their locker plant operations during late 1964 as part of their increased merchandising efforts. These additions helped increase meat sales; but what was more important, they provided services needed in rural communities which were reflected in increased patronage. Average total margins on grocery (merchandise) sales increased nearly 400 percent between 1964, which was typical of earlier years, and 1966.

This fourfold increase also represented a 16-percentage-point increase in margins from merchandise sales relative to total margins from all sales.

The revenue from byproducts, primarily inedible beef fat, sold by large cooperatives without slaughtering facilities tripled between 1964 and 1966. Four of the five managers sold inedible products to the highest bidding rendering firms.

### Receipts from Services

Excluding slaughtering, similar services—locker renting, meat processing, pork curing, and the like—were provided by both groups of large plants. Average total revenue from comparable services were nearly identical during 1960—\$48,296 for plants with and \$48,425 for plants without slaughtering facilities. By 1966, revenues from services increased at a substantially faster rate for plants with slaughtering facilities than for plants without—\$58,772 and \$53,857, respectively (table 17).

*Locker Renting.*—Large plants received similar dollar revenue during 1960 from renting lockers and bulk cold storage space—approximately \$11,800 and \$12,000 for cooperatives with and without slaughtering facilities. Plants in the first group received slightly more revenue from this service in 1966 than in 1960. However, plants in the latter group averaged nearly \$2,300 less locker rental income than they did 7 years earlier.

The cost of operating the cold storage locker room is fixed and must be paid regardless of the number of

Table 17.—Revenue: Average receipts from services provided, large plants with and without slaughtering facilities, selected years

Service	Receipts from services provided by plants in—							
	1960		1962		1964		1966	
	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
<i>With slaughtering facilities</i>								
Slaughtering	11,565	19	10,777	18	13,173	20	12,507	18
Locker renting <sup>1</sup>	11,753	20	11,905	20	11,356	17	11,829	17
Meat processing	28,247	47	30,942	52	36,918	55	42,097	59
Pork curing	5,343	9	2,964	5	3,238	5	3,007	4
Poultry eviscerating	1,687	3	1,544	3	1,220	2	1,068	1
Lard rendering	1,266	2	995	2	1,040	1	771	1
Miscellaneous	—	—	—	—	—	—	—	—
Total	59,861	100	59,127	100	66,945	100	71,279	100
<i>Without slaughtering facilities</i>								
Slaughtering	—	—	—	—	—	—	—	—
Locker renting <sup>1</sup>	11,988	25	11,502	24	10,713	21	9,706	18
Meat processing	28,377	59	28,838	61	32,102	65	36,792	69
Pork curing	4,416	9	3,775	8	3,837	8	4,907	9
Poultry eviscerating	657	1	405	2	325	2	145	—
Lard rendering	2,467	5	2,198	5	1,965	4	1,687	3
Miscellaneous	520	1	848	2	931	2	620	1
Total	48,425	100	47,566	100	49,873	100	53,857	100

<sup>1</sup> Includes locker and bulk storage rental income.

<sup>2</sup> Less than 1 percent.

lockers or amount of bulk storage space rented. Once this cost is covered, additional income from the rental service is almost entirely a net amount. For that reason, locker plant managers need to have every cubic foot of usable cold storage space produce income.

A slaughtering service generally stimulates demand for lockers. The patron that has a 1,000-pound beef animal custom slaughtered and processed usually rents a locker for overflow storage. On the other hand, a patron who purchases a quarter carcass and has it processed would probably have ample storage space in his homefreezer and therefore would not rent a locker.

**Meat Processing.**—Large plants with and without slaughtering facilities received similar dollar revenue during 1960 from processing meat—averaging \$28,247 and \$28,377. Plants with slaughtering facilities increased their meat processing revenue to an average of \$42,100 in 1966—50 percent greater than in 1960. Of the increased revenue, 26 percent resulted from higher processing volume, and 24 percent from higher processing rates.

The average large plant without a slaughtering facility increased its meat processing revenue to nearly \$36,800 during 1966—30 percent greater than in 1960. Six percent resulted from higher meat processing volume, and 24 percent from higher processing rates.

Meat processing is the most important custom service provided by both groups of large plants. In 1966, meat processing averaged 59 percent of total revenue from all services provided by large plants with slaughtering facilities, 12 percentage points over 1960. Large plants without slaughtering facilities derived an average of 69 percent of their service revenue from meat processing in 1966—10 percentage points increase over 1960. This suggests that the phrase, "meat processing," might be more appropriate in the business name of locker cooperatives than the present phrase, "locker plant."

**Pork Curing.**—Average revenue from the pork curing service provided by large plants with slaughtering facilities declined from approximately \$5,350 in 1960 to \$3,000 in 1966. By 1966, revenue from curing accounted for only 4 percent of total revenue from all services.

Revenue from the pork curing service provided by large plants without slaughtering facilities was approximately 10 percent greater in 1966 than in 1960. By 1966, it accounted for an average of 9 percent of total revenue from all services.

**Other Services.**—Revenue from poultry eviscerating, lard rendering, and miscellaneous services declined at

similar rates for both groups of large plants. On the average, these services provided nearly \$3,000 revenue to large plants with slaughtering facilities in 1960. By 1966 revenue from these services declined to \$1,800 and accounted for 2 percent of revenue from all services.

Revenue from these minor custom services declined from approximately \$3,600 in 1960 to \$2,400 in 1966 for large plants without slaughtering facilities. These services accounted for only 4 percent of revenue from all services provided by cooperatives in this group during 1966, which was a 3-percentage-point decline since 1960.

Both groups of cooperatives need to reexamine carefully low volume or low revenue services, either to make them self-supporting or to discontinue them.

*Livestock Slaughtering.*—Consideration of livestock slaughtering was left until now to simplify comparing the other services common to both groups of large plants. Slaughtering ranked third in its contribution to total receipts from services in 1960, but by 1966, it became the second most important source of revenue to large locker plants with slaughtering facilities. Revenue from the slaughtering service exceeded \$12,500 in 1966, in addition to income (table 16) from sale of hides.

*Total Receipts.*—Total receipts from all services provided by large plants with slaughtering facilities increased an average of 19 percent between 1960 and 1966—from \$59,861 to \$71,279. Services accounted for 83 percent of total revenue during 1966, unchanged since 1960—additional evidence that these cooperatives continued to operate primarily on a custom service basis.

Total receipts from all services provided by large plants without slaughtering facilities increased an average of 11 percent between 1960 and 1966—from \$48,425 to \$53,857. Receipts from services declined from 89 percent of total revenue in 1960 to 82 percent in 1966—evidence that these cooperatives began to shift from custom services to other income producing activities, such as merchandising.

## Operating Expenses

Operating expenses include labor, supplies, and utilities in addition to depreciation, repairs, insurance,

advertising, and taxes (table 18). Costs such as saw sharpening, travel to meetings, subscriptions to trade journals, and laundry service are considered miscellaneous items.

*Labor.*—Labor expense—wages, salaries, bonuses, commissions, payroll taxes, and fringe benefits—incurred by large plants with slaughtering facilities increased from an average of \$37,064 in 1960 to over \$50,000 by 1966. Labor accounted for 90 percent of the increase in total operating expenses among these plants. By 1966, it accounted for 65 percent of total operating expenses, a 6-percentage-point increase over 1960.

Cost for labor hired by large plants without slaughtering facilities also increased from an average of \$31,493 in 1960 to \$38,841 in 1966. This item accounted for two-thirds of total operating expenses among this group of plants in 1966, 2 percentage points greater than in 1960.

The labor expense divided by the number of man-hours hired gives an approximate hourly cost of labor that is useful for comparison only. It is not the same as an hourly wage rate actually paid to labor.

The average hourly cost of labor hired by large plants with slaughtering facilities was computed at \$1.43 in 1960; it increased 34 percent, to \$1.91 an hour by 1966. This 5.6-percent average annual increase exceeded the 5-percent average annual increase in labor productivity over the same time.

The average hourly cost of labor hired by large plants without slaughtering facilities was computed at \$1.68 in 1960 and also increased 34 percent, to \$2.25 an hour in 1966. This 5.6-percent average annual increase also exceeded the 3.3 percent average annual increase in labor productivity.

The differences in computed average hourly costs of labor between the two groups of plants should be expected, since labor used for slaughtering livestock was usually not as skilled as meat cutters and consequently commanded a lower wage rate.

*Supplies.*—Supplies used for production and plant operations were the second major cost item in all large plants. Supplies included freezer paper for wrapping processed meat, spices for curing pork and making sausage, salt for curing hides, and office and janitorial supplies.

Supplies accounted for 12 percent of average total operating expenses in large plants with slaughtering

Table 18.—Expenses: Average total operating expenses incurred by large plants with and without slaughtering facilities, selected years

Expense item	Total operating expenses of large plants in—							
	1960		1962		1964		1966	
	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
<i>With slaughtering facilities</i>								
Labor <sup>1</sup>	37,064	59	39,364	62	43,735	64	50,016	65
Supplies	8,455	14	8,431	13	8,951	13	9,358	12
Utilities <sup>2</sup>	4,472	7	4,273	7	4,182	6	4,341	6
Depreciation	3,968	6	3,822	6	3,650	5	4,129	5
Repairs	2,122	3	1,793	3	1,704	2	1,704	2
Insurance	1,584	3	1,785	3	1,824	3	1,933	3
Advertising	216	... <sup>3</sup>	199	... <sup>3</sup>	527	1	400	... <sup>3</sup>
Taxes	1,628	3	1,354	2	1,484	2	1,577	2
Miscellaneous <sup>4</sup>	3,242	5	2,757	4	2,884	4	3,655	5
Total	62,751	100	63,778	100	68,941	100	77,113	100
<i>Without slaughtering facilities</i>								
Labor <sup>1</sup>	31,493	64	29,678	65	33,427	66	38,841	66
Supplies	5,118	10	4,541	10	4,460	9	5,528	9
Utilities <sup>2</sup>	4,325	9	3,767	8	3,875	8	4,420	7
Depreciation	3,013	6	2,598	6	2,489	5	2,960	5
Repairs	1,316	3	1,291	3	1,352	3	1,798	3
Insurance	751	2	844	2	803	2	807	1
Advertising	373	... <sup>3</sup>	296	... <sup>3</sup>	352	... <sup>3</sup>	982	2
Taxes	1,216	2	1,028	2	1,035	2	1,363	2
Miscellaneous <sup>4</sup>	2,115	4	1,865	4	2,262	5	2,682	5
Total	49,720	100	45,908	100	50,055	100	59,381	100

<sup>1</sup>Includes payroll taxes and fringe benefits.

<sup>2</sup>Includes electricity, heat, water, sewage, and telephone.

<sup>3</sup>Less than 1 percent.

<sup>4</sup>Includes contributions, saw sharpening, laundry service, etc.

facilities during 1966, a 2-percentage-point decline since 1960. Supplies cost an average of \$1.33 per hundred pounds of product handled by these plants in 1960 but declined to \$1.17 a hundred pounds by 1966.

Supplies accounted for an average 9 percent of total operating expenses in large plants without slaughtering facilities in 1966. Supply costs averaged 88 cents per hundred pounds of product handled during 1966, unchanged since 1960. The higher unit cost for supplies used by the first group of plants can be attributed to the additional supplies needed for slaughtering.

**Utilities.**—Utility costs include electricity, heat, water, sewage, and telephone, with electricity the largest single item.

Large plants with and without slaughtering facilities maintained refrigerated facilities of similar size. Their utility costs were also similar—\$4,472 and \$4,325 respectively in 1960, and \$4,341 and \$4,420 respectively in 1966.

Utility costs actually declined 3 percent in large plants with slaughtering facilities, while meat processing volume increased 26 percent between 1960 and 1966. Utilities accounted for 6 and 7 percent of total operating expenses in all large plants.

**Other Operating Expenses.**—Depreciation, repairs, insurance, advertising, taxes (excluding payroll), and miscellaneous items also changed between 1960 and 1966. As shown in table 18, some items increased while others declined. These expenses declined from an average of 20 percent of total operating expenses in 1960 to 17 percent in 1966 in large plants with slaughtering facilities.

Similar cost items incurred by large plants without slaughtering facilities increased from 17 percent of total operating expenses in 1960 to 18 percent in 1966. A major portion of the increase can be attributed to higher spending for advertising and promotion—to expand their merchandising program.

Table 19.—Revenue, expenses, and net gain: Averages for large plants with and without slaughtering facilities, 1960 and 1966

Item	Revenue, expenses, and net gain of plants					
	1960		1966		Change from 1960 to 1966	
	Dollars	Percent	Dollars	Percent	Dollars	Percent
<i>With slaughtering facilities</i>						
Revenue:						
Products	12,260	17	14,840	17	2,580	21
Services	59,861	83	71,279	83	11,418	19
Total	72,121	100	86,119	100	13,998	19
Expenses	-62,751	-87	-77,113	-90	-14,362	23
Net gain (loss)	9,370	13	9,006	10	(364)	
<i>Without slaughtering facilities</i>						
Revenue:						
Products	5,784	11	11,656	18	5,872	101
Services	48,425	89	53,857	82	5,432	11
Total	54,209	100	65,513	100	11,304	21
Expenses	-49,720	-92	-59,381	-91	-9,661	19
Net gain (loss)	4,489	8	6,132	9	1,643	

## Net Gain on Operations

Table 19 summarizes data presented in tables 16, 17, and 18, and also shows the amount of money remaining after all operating expenses were paid. The difference between income and expenses is referred to as net gain or net loss.

On the average, revenue from products sold and services provided by large plants with slaughtering facilities increased by 21 and 19 percent between 1960 and 1966. However, these revenues remained unchanged at 17 and 83 percent of total revenue in this timespan.

In large plants with slaughtering facilities, average total revenue increased by \$13,998, while average total operating expenses increased \$14,362. Average net gain declined slightly in 1960-66. In 1960, these cooperatives averaged 13 percent net gain on total revenue, but by 1966 that level had declined to 10 percent.

Average revenue from products sold by large plants without slaughtering facilities more than doubled between 1960 and 1966, while average revenue from services increased 11 percent. A substantial shift in sources of revenue from services to sales also occurred in 1960-66 among large plants without slaughtering facilities. For instance, in 1960, 11 percent of total revenue was derived from sale of products, while 89 percent was derived from services. In 1966, 18 percent of total revenue was derived from the sale of products and 82

percent from services. This change is additional evidence that these cooperatives have modified their operating programs.

In 1960, large plants without slaughtering facilities averaged 8 percent net gain on total operations. By 1966, that level increased to 9 percent.

The 3-percentage-point decline and the 1-percentage-point increase in average net gain among plants with and without slaughtering facilities between 1960 and 1966 resulted from management planning (table 19). Both groups were striving for a 10-percent net gain on plant operations.

## Predicting Total Operating Income

Selected factors previously discussed were analyzed to determine their usefulness in developing an equation for predicting total annual operating income. Separate analyses were made for large plants with and without slaughtering facilities. Results point out the possibilities for increasing total annual operating income and supplement study findings. A more detailed discussion of the analysis together with the income-predicting equations for both groups of large plants is in the appendix.

### Large Plants With Slaughtering Facilities

The total annual operating income for large plants with slaughtering facilities was significantly influenced

by only three of the 10 factors analyzed—number of patrons served, income from meat processing, and income from livestock slaughtering.

The analysis suggests that management of large plants with slaughtering facilities should increase total income primarily by serving a greater number of patrons and by continuing to provide meat processing and livestock slaughtering services.

Each additional patron served by a large plant with slaughtering facilities increased total annual operating income by \$15.09. Each additional dollar from the meat processing service added \$1.21 to total annual operating income. Apparently, patrons who had meat processed at their cooperative also requested other income producing services besides simply having the meat cut, wrapped, and frozen. Each additional dollar received from the livestock slaughtering service added only 58 cents to total annual operating income. Although this may appear unreasonable, recall that these cooperatives included the beef hide as part of the slaughtering fee. However, only the cash portion of the slaughtering fee was included in computing the slaughtering service's contribution to total income; the sale of the beef hide was considered income from the sale of products.

These three factors—number of patrons served, income from meat processing, and income from livestock

slaughtering—accounted for 97 percent of the variation in total annual operating income.

### Large Plants Without Slaughtering Facilities

Total annual operating income for large plants without slaughtering facilities was also significantly influenced by three of the 10 factors analyzed—income from meat processing, pounds of pork cured, and income from margins on sale of products.

The analysis suggests that the management of large plants without slaughtering facilities should increase total income primarily through their meat processing service and sales activities. Each additional dollar from the meat processing service added \$1.12 to total annual operating income. Each additional pound of pork cured added another 15 cents and each additional dollar from the sale of products added 79 cents to total annual operating income.

These three factors accounted for 98 percent of the variation in total annual operating income among large plants without slaughtering facilities.

## Small Locker Cooperatives With and Without Slaughtering Facilities

The objectives of small frozen food locker cooperatives were similar to those of large plants—to process and store food products, to purchase food and other supplies, and to perform other services as requested by members. The management of both groups of small plants viewed its primary responsibility as one of providing custom services for farmer-members. Small plants with slaughtering facilities have shifted towards increased merchandising because the demand for custom services has declined. The small plants without slaughtering facilities made no changes in the method and scope of their operations between 1960 and 1966.

Certain provisions of the Wholesome Meat Act of 1967 (also known as the Federal Meat Inspection Act) together with provisions in meat inspection legislation enacted by the various States will require many locker

plants to improve their existing facilities and equipment. In some instances, the improvements will require sizable investments of capital—capital that may not be available to the smaller firms, or investments that cannot be recovered from small-volume operations even if the capital is available.

### Volume

Before managements of many small locker cooperatives reach a final decision about making necessary improvements, they should examine the level of output for the various services they provide. The low and generally declining volume of products handled since at least 1960 is cause for serious concern about the future of small locker plants.

## Livestock Slaughtered

The number of cattle slaughtered was approximately the same in 1966 as in 1960; some fluctuations occurred during 1962 and 1964 (table 20). As with the large plants, cyclical (year-to-year change) fluctuations probably resulted from relative changes in the prices of cattle and hogs.

Table 20.—Livestock: Average number of animals slaughtered, by species and type of account, small plants with slaughtering facilities, selected years

Species and year	Livestock slaughtered—		
	Total	For patron account	For plant account
----- Number -----			
Cattle:			
1960	319	316	3
1962	301	293	8
1964	363	353	10
1966	321	314	7
Hogs:			
1960	474	449	25
1962	350	325	25
1964	371	354	17
1966	290	280	10
Lambs:			
1960	14	14	—
1962	23	23	—
1964	13	13	—
1966	13	13	—

Managers of the small plants bought a few locally raised cattle, usually from cooperative members who wanted to sell an extra animal or two. Cattle purchased for slaughter and resale accounted for only 1 to 3 percent of total slaughter volume. No meaningful change occurred over the four time periods.

Data in table 21 suggest that cattle slaughter volume was probably as uniformly distributed over the 12 months as could be expected, considering that it was almost all custom volume. January, November, and December 1966 were the heaviest volume months of the year, unchanged since 1960.

Hog slaughter volume was also quite cyclical and generally trended downward. The total number of hogs slaughtered by small plants declined by 40 percent from an average of 474 in 1960 to 290 in 1966.

Plant managers bought a few hogs for slaughter and resale. They indicated that hogs were bought to fill patrons' orders for pork carcasses. Hogs were not bought for the expressed purpose of curing the hams and bacons, and making sausage for resale. Usually less than

Table 21.—Livestock: Average number of cattle and hogs slaughtered and percentage distribution by months, small plants with slaughtering facilities, 1966

Month	Livestock slaughtered by plants in 1966			
	Cattle		Hogs	
	Number	Percent	Number	Percent
January	32	10.0	26	9.0
February	23	7.2	22	7.6
March	26	8.1	25	8.6
April	27	8.4	20	6.9
May	24	7.5	13	4.5
June	27	8.4	11	3.8
July	22	6.8	14	4.8
August	27	8.4	11	3.8
September	20	6.2	18	6.2
October	27	8.4	36	12.4
November	31	9.7	45	15.5
December	35	10.9	49	16.9
Total	321	100.0	290	100.0
Average	27	8.3	24	8.3

5 percent of total hog slaughter volume was on the cooperative's own account.

As with large plants, seasonality of hog slaughter volume was a serious management problem among small plants, as the data in table 21 suggests. Nearly half—45 percent—of the total slaughter volume came into these plants during a 3-month period—October, November, and December 1966—no meaningful change had occurred since 1960. Very few hogs were slaughtered during the spring and summer months.

Lambs accounted for approximately 2 percent of total number of animals custom slaughtered during each of the four time periods studied.

Abattoir facilities of small plants were restricted in size to the extent that one animal would be completely dressed and its carcass put in the chill cooler before the next animal was dispatched. Usually, cattle were scheduled for slaughter one day and hogs another day of the same week. During low-volume periods, both species of livestock were usually slaughtered the same day. One butcher generally performed all slaughtering functions. Under this arrangement, an average monthly slaughter volume of 30 cattle and 45 hogs was probably the maximum that could be handled reasonably well.

## Meat Processed

Trends cannot be cited for the volume of meat processed by either group of small plants. The total volume declined during 1962, increased in 1964, and

Table 22.—Fresh meat: Average volume of meat processed by kind of meat and type of account, small plants with and without slaughtering facilities, selected years

Year	Meat processed by small plants—					
	Total	For patron account		For plant account		
		Beef	Pork	Other <sup>1</sup>	Beef	
----- 1,000 pounds -----						
<i>With slaughtering facilities</i>						
1960	226	115	89	5	10	
1962	206	113	66	6	14	
1964	236	143	68	6	15	
1966	198	123	49	5	16	
<i>Without slaughtering facilities<sup>2</sup></i>						
1960	60	32	26	2	---	
1962	55	33	20	2	---	
1964	75	50	22	3	---	
1966	55	41	12	2	---	

<sup>1</sup>Includes lamb and wild game.

<sup>2</sup>Averages based on 4 plants instead of 5 plants.

Less than 1,000 pounds.

declined again in 1966. However, general observations can be made from the data in table 22.

The small plants with slaughtering facilities processed an average of 198,000 pounds of meat in 1966, 12 percent—28,000 pounds—less than in 1960. These cooperatives made no substantial effort to increase meat sales volume between 1960 and 1966. By 1966, approximately 89 percent of total processing volume was on a custom basis, a 3-percentage-point decline over earlier years.

Small plants without slaughtering facilities processed an average of 55,000 pounds of meat in 1966, 8 percent less than in 1960. All the meat was custom processed during all four periods.

Both groups of small plants experienced a changing product mix—shifting from pork to beef—between 1960

and 1966. Small plants with slaughtering facilities processed a greater volume of beef in 1966 than in 1960, but pork processing volume declined. The net result of this change is that beef increased from 55 percent of total processing volume in 1960 to 70 percent in 1966.

Small plants without slaughtering facilities also processed more beef and less pork in 1966 than in 1960. Beef increased from 53 percent of total processing volume in 1960 to 75 percent in 1966.

Both groups of small cooperatives need to be seriously concerned about the lower volume of meat processed during 1966 than during 1960. Reversing that downward trend will not be easy.

## Other Products Handled

The volume of pork cured, sausage made, lard rendered, and poultry dressed by the small plants with and without slaughtering facilities was considerably less in 1966 than in 1960 (table 23).

Changes in the volume of pork products that were further-processed depended almost entirely on changes in the volume of fresh pork that was processed. For instance, the 48-percent decline in volume of pork cured and the 46-percent decline in volume of lard rendered by small plants with slaughtering facilities can be related directly to the 44-percent decline in the volume of fresh pork processed between 1960 and 1966. The amount of sausage made also declined but at a slower rate—only 31 percent less in 1966 than in 1960.

During 1966, both groups of small plants cured similar amounts of pork relative to their total pork processing volume—24 percent and 25 percent—by plants with and without slaughtering facilities, respectively.

Table 23.—Meat products: Average volume handled by small plants with and without slaughtering facilities, selected years

Year	Meat products handled by plants—						
	With slaughtering facilities				Without slaughtering facilities <sup>2</sup>		
	Pork cured	Sausage made	Lard <sup>1</sup> rendered	Poultry dressed	Pork cured	Sausage made	Lard <sup>1</sup> rendered
----- Pounds -----							
1960	25,000	5,425	6,850	1,850	4,000	1,500	1,750
1962	19,000	4,200	4,775	1,650	3,000	1,335	1,475
1964	15,000	4,400	4,350	1,675	5,000	1,690	2,225
1966	13,000	3,725	3,700	1,125	3,000	1,080	1,225

<sup>1</sup>Weights are based on unrendered pork fat.

<sup>2</sup>Averages based on 4 plants instead of 5 plants. These plants do not dress poultry.

Seven percent of total pork processing volume was further processed into sausage products by the small plants with slaughtering facilities in 1966, a 1-percentage-point increase since 1960. Small plants without slaughtering facilities used approximately 9 percent of their fresh pork volume to make sausage, a 3-percentage-point increase since 1960. The actual quantities of pork made into sausage were at such low levels that the relative increases were unimportant. Similarly, the slight increases in amount of fat rendered into lard relative to total pork processing volume were also unimportant because of the low and declining volumes handled.

Managers of both groups of plants made no effort to cure pork or make sausage for sale, although small plants with slaughtering facilities were in a satisfactory position to do so.

## Refrigerated Facilities

Four of the five small cooperatives with slaughtering facilities remodeled their refrigerated facilities between 1960 and 1966. In every instance, the size of the cold storage freezer was reduced. Small cooperatives without slaughtering facilities made no changes in the physical size of their plants during that period.

Plants with slaughtering facilities had nearly three times as much refrigerated space in 1966 as plants without such facilities—14,275 cubic feet compared with 5,175 cubic feet (table 24).

The following tabulation shows that during 1966, large and small plants with slaughtering facilities allocated refrigerated space among the various rooms in a similar manner:

Type of room	Large plant	Small plant
-- Percent --		
Chill cooler	12	10
Age cooler	17	18
Sharpfreezer	6	9
Cold storage freezer	43	41
Cure cooler	18	21
Other	4	1
Total	100	100

In contrast, the following tabulation shows that differences existed in the allocation of refrigerated space by large and small plants without slaughtering facilities:

Type of room	Large plant	Small plant
-- Percent --		
Chill cooler	8	24
Age cooler	13	5
Sharpfreezer	5	1
Cold storage freezer	56	70
Cure cooler	18	0
Total	100	100

## Chill and Age Coolers

Small plants with slaughtering facilities maintained space for chilling freshly slaughtered carcasses. Managers indicated that carcasses remained in the chill cooler for 3 to 4 days when volume and work conditions permitted, compared with the 1-day time of large plants with slaughtering facilities. These small plants also had special facilities similar to those maintained by large plants for aging beef carcasses.

Table 24.—Refrigerated facilities: Average area of specific rooms, small plants with and without slaughtering facilities, 1966

Type of room	Volume of refrigerated space in plants—	
	With slaughtering facilities	Without slaughtering facilities
----- Cubic feet -----		
Chill cooler	1,375	1,260
Age cooler	2,690	265
Sharpfreezer	1,265	<sup>1</sup> 50
Cold storage freezer	5,840	3,600
Cure cooler	2,925	---
Other <sup>2</sup>	180	---
Total	14,275	5,175

<sup>1</sup> All small plants without slaughtering facilities had sharpfreezer cabinets located within the cold storage freezer.

<sup>2</sup> Rooms used to store dairy products, eggs, fruits, and vegetables.

Small plants without slaughtering facilities aged most of their beef carcasses in the chill coolers because of their extremely limited age cooler space. This involved a mixing of freshly slaughtered carcasses with those already chilled which is a poor arrangement from the standpoint of product quality. For instance, when a freshly slaughtered beef carcass is put in a chill-age cooler it causes the temperature of products already chilled to rise several degrees for a time. Also, moisture drawn from the hot carcass condenses on the surface of the cold carcasses, encouraging undesirable mold growth.

### Sharpfreezer

The small plants with slaughtering facilities had regular sharpfreezer rooms (similar to those in large plants) that were serviced from the processing area. The small plants without slaughtering facilities used metal sharpfreezer cabinets that measured about 7 feet long, 5 feet high, and 2½ feet deep outside. The cabinets were located along one wall of the cold storage freezer room and occupied as much space as three tiers of lockers.

### Cold Storage Freezer

On the average, small plants with slaughtering facilities reduced the size of their cold storage rooms from 8,660 cubic feet in 1960 to 5,840 cubic feet in 1966, since demand for and use of that space had declined substantially since 1960. Small plants without slaughtering facilities had an average of 3,600 cubic feet of space in 1966—unchanged since 1960.

### Cure Cooler

Cure coolers in the small plants with slaughtering facilities were specially designed and equipped for that particular function, which did not allow use of the space for other purposes during low-volume months. Small plants without slaughtering facilities did not cure meat so they did not have cure coolers.

### Rates

Both groups of small plants maintained steady locker rental rates between 1960 and 1966—\$12.05 and \$10.35 for plants with and without slaughtering facilities (table 25).

As with large plants, rates charged by the small plants for slaughtering cattle included a cash fee in addition to the value of hide. As hide values declined, plant managers apparently increased the cash portion of the fee enough to maintain the income per animal slaughtered at \$4.90.

Rates charged for slaughtering hogs increased from an average of \$2.10 in 1960 to \$2.30 in 1966, accounted for primarily by an increase in rates charged for hogs that weighed over 250 pounds. Managers indicated that during 1966 they lost money on every animal slaughtered. However, they thought the rates charged were as high as farmers were willing to pay.

Between 1960 and 1966, both groups of small cooperatives increased processing fees by 65 to 80 cents

Table 25.—Rates: Averages charged for specific services, small plants with and without slaughtering facilities, July 1, 1960 and 1966

Service	Rates charged by plants—			
	With slaughtering facilities		Without slaughtering facilities	
	1960	1966	1960	1966
Dollars				
Locker renting, per year	12.05	12.05	10.35	10.35
Slaughtering, per head of:				
Cattle	4.90 <sup>1</sup>	4.90	— <sup>2</sup>	— <sup>2</sup>
Hogs	2.10	2.30	— <sup>2</sup>	— <sup>2</sup>
Processing, per cwt. of:				
Beef	3.85	4.50	3.45	4.25
Pork	3.65	4.40	3.45	4.25
Curing, per cwt.	6.30	7.30	0 <sup>3</sup>	0 <sup>3</sup>

<sup>1</sup>Includes cash and the value of hide.

<sup>2</sup>These plants do not provide this service.

<sup>3</sup>Some plants provide this service but the charge is included in the pork processing fee.

Table 26.—Man-years: Average number used, small plants with and without slaughtering facilities, selected years<sup>1</sup>

Function	Man-years used by plants—							
	With slaughtering facilities				Without slaughtering facilities			
	1960	1962	1964	1966	1960	1962	1964	1966
----- Man-years -----								
Slaughtering <sup>2</sup>	0.7	0.7	0.6	0.6	—	—	—	—
Processing	2.5	2.3	2.4	2.0	0.9	0.8	1.0	0.8
Curing	.3	.2	.2	.2	—	—	—	—
Sales	.2	.2	.2	.2	—	—	—	—
Administration	.5	.5	.4	.4	—	—	—	—
Total	4.2	3.9	3.8	3.4	.9	.8	1.0	.8

<sup>1</sup> A man-year equals 2,080 hours (52 40-hour weeks).

<sup>2</sup> Includes poultry eviscerating.

per 100 pounds of product. Plants with slaughtering facilities charged slightly higher rates for processing than plants without slaughtering facilities.

Most managers did not have accounting systems that provided adequate cost information, but they believed that income from processing did not cover the costs incurred by that service. Both processing and slaughtering services were apparently subsidized by income from the locker rental service.

## Employment

On the average, small plants with slaughtering facilities employed 3.4 man-years of labor in 1966, approximately 20 percent less than in 1960 (table 26). The major portion of total man-years used by these plants was allocated to processing. Slaughtering was the second heaviest labor user. Changes in the amount of labor used for each function was generally related to changes in volume of products handled. However, small cooperatives tended to reduce their labor force at a slower rate than volume declined.

Small plants with slaughtering facilities had “working-manager” employees who devoted part of their time to management (administration) and part to other activities such as meat processing.

On the average, small plants without slaughtering facilities employed only 0.8 man-year in 1966, slightly less than during earlier years. All labor was allocated to meat processing. The time required for management (administration) of these small locker plant operations was minimal and was provided by managers of the parent organizations.

## Patrons

In 1960, 94 percent of the 724 average number of patrons served by small plants with slaughtering facilities were farmers (table 27). Between then and 1966, two changes occurred that need management’s immediate attention. First, the total number of patrons declined more than 10 percent. These cooperatives need to be more responsive to their members’ changing needs to reverse that downtrend. They already have the organiza-

Table 27.—Patrons: Average number served, small plants with and without slaughtering facilities, selected years

Year	Patrons served by plants—					
	With slaughtering facilities			Without slaughtering facilities		
	Total	Farmer	Nonfarmer	Total	Farmer	Nonfarmer
----- Number -----						
1960	724	680	44	245	245	—
1962	675	615	60	236	236	—
1964	706	626	80	294	286	8
1966	645	565	80	240	230	10

tional flexibility, the basic sales and service programs, and the plant capacity to serve a greater number of patrons—farmers and nonfarmers alike—and to serve them more effectively. And second, patronage began to shift from farmers to nonfarmers. For instance, in 1966, 12 percent of the 645 patrons served by the average plant in this group were nonfarmers—nearly twice as many as were served in 1960. Small plants without slaughtering facilities served nearly as many patrons in 1966 as in 1960.

The number of patrons served by both groups of small plants increased in 1964 over earlier time periods. As in large plants, managers of small locker plants indicated that some members who did not patronize their cooperative regularly expected a price control and rationing program during 1964. They began patronizing their locker cooperatives again in case they had to increase the amount of food produced for their own use, as they did under a similar rationing program during World War II.

Neither group of small cooperatives served wholesale customers. However, they stored National School Lunch Program foods on a temporary basis for schools (institutional accounts) in their communities, as a community service rather than as a source of revenue.

## Meat Processed Per Patron

Small plants with slaughtering facilities processed 11 percent more meat per patron during 1966 than small

plants without slaughtering facilities—averaging 334 and 295 pounds, respectively (table 28).

The amount of beef processed per patron during 1966 increased 42 and 40 pounds in plants with and without slaughtering facilities. However, those increases did not offset the 64 and 83 pound declines in the amount of pork products processed per patron served during the same time. The net result was that the total volume of meat processed per patron by the small plants with and without slaughtering facilities declined 6 and 13 percent, respectively, between 1960 and 1966.

In 1966, small plants with slaughtering facilities processed an average of 24 more pounds of fresh pork per patron than small plants without slaughtering facilities. Seven years earlier both groups of plants were nearly equal. This particular comparison supports the idea that farmers are willing to have pork custom processed if the locker plant provides a slaughtering service.

Both groups of small cooperatives have adequately served their patrons' needs in terms of the amount of meat processed for each patron. Their primary efforts for increasing volume seem to depend on serving a greater number of patrons. In addition to conducting membership drives, plants with slaughtering facilities might consider increasing their merchandising activities by producing and selling a selected line of specialty meat products. The small plants without slaughtering facilities might consider developing complete service programs that include livestock slaughtering, pork curing, and lard

Table 28.—Meat processed per patron: Average volume in small plants with and without slaughtering facilities, selected years

Year	Volume of meat processed per patron										
	Total	Beef	Pork			Poultry	Other <sup>1</sup>				
			Fresh	Cured	Sausage						
- - - - Pounds - - - -											
<i>With slaughtering facilities</i>											
1960	357	173	132	35	7	3	7				
1962	341	188	108	28	6	2	9				
1964	365	224	102	22	6	2	9				
1966	334	215	84	20	6	2	7				
<i>Without slaughtering facilities<sup>2</sup></i>											
1960	338	165	134	21	8	--	10				
1962	304	169	103	15	7	--	10				
1964	301	187	82	19	6	--	7				
1966	295	205	60	15	5	--	10				

<sup>1</sup>Includes lamb and wild game.

<sup>2</sup>Averages based on 4 instead of 5 plants.

rendering, as well as merchandising meat and meat products purchased from other meat processors.

## Efficiency

Generally, small plants with slaughtering facilities were more efficiently operated between 1960 and 1966 than small plants without the facilities.

### Labor Productivity

Because of the low volume of meat processed by small plants, their operations cannot be expected to be as productive as those in large plants. Unlike the large plants, the small plants did not have high-capacity processing equipment, skilled processing crews, efficient product flow, uniform processing volume, or the other factors that contribute to high labor productivity.

Meat processing employees in small plants with slaughtering facilities were only 2 percent more productive than those in small plants without slaughtering facilities

Table 29.—Labor productivity: Average volume of meat processed per man-year allocated to processing, small plants with and without slaughtering facilities, selected years<sup>1</sup>

Year	Volume of meat processed per man-year by plants—	
	With slaughtering facilities	Without slaughtering facilities <sup>2</sup>
----- Pounds -----		
1960	87,630	85,870
1962	87,830	83,800
1964	99,530	90,160
1966	96,810	89,500

<sup>1</sup>A man-year equals 2,080 hours (52 40-hour weeks).

<sup>2</sup>Averages based on 4 instead of 5 plants.

during 1960. By 1966, the difference had widened to approximately 8 percent. Labor productivity increased 10 percent in the plants with and 4 percent in plants without slaughtering facilities between 1960 and 1966. It reached the maximum level in 1964 for plants in both groups (table 29); this was the same year that the volume of meat processed reached its maximum level (table 22).

### Use of Refrigerated Facilities

The amount of meat passing through various refrigerated rooms during 1 year varied so markedly between the two groups of small plants that it is difficult to draw meaningful comparisons from the data in table 30. Certain figures in this table need clarification. Large amounts of beef aged by small plants without slaughtering facilities—120 pounds per cubic foot of age-cooler space in 1960 and 155 pounds in 1966—resulted from limited age-cooler space in which only selected primal cuts of beef were aged. Whole beef carcasses were aged in the chill coolers. While this arrangement improved the use of the age cooler it reduced product turnover in the chill cooler, since carcasses remained in it for 10 to 14 days instead of 2 or 3 days.

The amount of meat sharpfrozen by small plants without slaughtering facilities was also extremely high, an average of 1,080 pounds per cubic foot of space in 1966. Nearly all the space in these plants' sharpfreezer cabinets was usable. Packaged meat probably froze more quickly in the limited cabinet space than if placed in a sharpfreezer room which meant a greater number of product turnovers. Small plants with slaughtering facilities did not use their refrigerated rooms nearly as efficiently as they could have; compare tables 30 and 14, for example.

Table 30.—Use of facilities: Average annual volume of meat passing through specific types of refrigerated rooms, small plants with and without slaughtering facilities, 1960 and 1966

Type of facility and product	Use of refrigerated rooms by plants—			
	With slaughtering facilities		Without slaughtering facilities	
	1960	1966	1960	1966
----- Pounds per cubic foot -----				
Chill cooler; Meat	165	145	50	45
Age cooler; Beef	45	50	120	155
Sharpfreezer <sup>1</sup> ; Meat	180	155	1,185	1,080
Cold storage freezer; Meat	25	35	15	15
Cure cooler; Pork	10	5	—	—

<sup>1</sup>Small plants with slaughtering facilities use sharpfreezer rooms, while those without slaughtering facilities use sharpfreezer cabinets.

Table 31.—Use of facilities: Average number of lockers available to rent, rented, and percentage rented of total available, small plants with and without slaughtering facilities, selected years

Year	Lockers in plants—					
	With slaughtering facilities			Without slaughtering facilities		
	Available to rent	Rented	Percentage rented of total available	Available to rent	Rented	Percentage rented of total available
	Number	Number	Percent	Number	Number	Percent
1960	549	361	66	303	214	71
1962	517	324	63	289	206	71
1964	474	255	54	289	199	69
1966	426	223	52	285	193	68

The number of lockers available to rent and the number rented declined between 1960 and 1966 in both groups of plants (table 31). On the average, small plants with slaughtering facilities not only rented 138 fewer lockers in 1966 than in 1960, but also rented substantially fewer of those available: 52 percent in 1966 compared with 66 percent in 1960. This downward trend represents a serious threat to the financial stability of these plants, because net income from locker renting has been used to subsidize the monetary loss from the livestock slaughtering and meat processing services that were provided below cost.

The small plants without slaughtering facilities did a relatively better job than small plants with slaughtering facilities. On the average, they rented 193 lockers, or 68 percent of those available during 1966, amounting to 21 fewer lockers and a 3-percentage-point decline since 1960.

## Income and Expenses

If the trends in the amount and source of revenue from products sold and services provided and in costs incurred continue, many small locker cooperatives will be in serious financial difficulty in a few years.

### Margins on Product Sales

In 1960, managers of the small plants with slaughtering facilities adopted a retail price policy for meat sales similar to that of the large plants—maintain uniform prices for beef and pork carcasses and allow margins to absorb changes in wholesale prices—as the following tabulation shows:

Year	Computed average price for meat <sup>1</sup>	Margins on meat sales
	Cents per pound	Percent
1960	53	9.3
1962	49	7.6
1964	49	9.6
1966	49	8.0

<sup>1</sup>Prices do not include processing fees.

Percentage margins were calculated from the sales price of meat and were in addition to the meat processing fees listed in table 25.

Total margins from all products sold during 1966 by small plants with slaughtering facilities increased by an average of \$1,468—28 percent—over the 1960 level (table 32). The increased income from sale of merchandise and other food products more than offset the declines in income from the sale of meat and from the sale of inedible byproducts. The increased income from sales of merchandise suggests that these cooperatives have taken a broader view of their objectives. Total margins from all products sold by the small plants without slaughtering facilities were negligible.

### Receipts from Services

Small plants with slaughtering facilities provided a wide range of income-producing custom services. However, income from every service, except slaughtering, was less in 1966 than in 1960. On the average, total receipts from services provided declined more than \$3,000—17 percent—between 1960 and 1966 (table 33). As a result, income from meat processing and livestock slaughtering services became relatively more important.

Table 32.—Revenue: Average margins from products sold, small plants with and without slaughtering facilities, 1960 and 1966

Product	Margins from products sold by plants in—			
	1960		1966	
	Dollars	Percent	Dollars	Percent
<i>With slaughtering facilities</i>				
Meat	908	23	864	16
Merchandise	1,565	38	3,497	63
Inedibles	1,599	39	1,179	21
Total	4,072	100	5,540	100
<i>Without slaughtering facilities</i>				
Meat	---	---	10	17
Merchandise	---	---	---	---
Inedibles	29	100	48	83
Total	29	100	58	100

Table 33.—Revenue: Average receipts from services provided, small plants with and without slaughtering facilities, 1960 and 1966

Service	Receipts from services provided by plants in—			
	1960		1966	
	Dollars	Percent	Dollars	Percent
<i>With slaughtering facilities</i>				
Slaughtering	1,757	10	1,920	13
Locker renting <sup>1</sup>	4,473	26	3,089	22
Meat processing	9,258	53	8,216	57
Pork curing	1,487	9	855	6
Poultry eviscerating	156	1	155	1
Lard rendering	176	1	128	1
Miscellaneous	86	...	---	...
Total	17,393	100	14,363	100
<i>Without slaughtering facilities</i>				
Slaughtering	---	—	---	—
Locker renting <sup>1</sup>	2,167	55	1,933	49
Meat processing	1,697	43	1,948	49
Pork curing	10	...	4	...
Poultry eviscerating	---	—	---	—
Lard rendering	---	—	---	—
Miscellaneous	59	2	71	2
Total	3,933	100	3,956	100

<sup>1</sup>Includes both locker and bulk storage rental income.

<sup>2</sup>Less than 0.5 percent.

Small plants without slaughtering facilities provided only two income producing services—locker renting and meat processing—each of which accounted for 49 percent of total service revenue in 1966. The costs of making sausage and rendering lard were included in the single fee charged for processing pork so these services did not produce additional income. They also provided a curing service with handling charges of 1 to 2½ cents a pound. The fresh pork was sent to other locker plants to be cured. Average locker rental income declined \$234

between 1960 and 1966 but was more than offset by \$251 increase in income from meat processing. Total receipts from services increased by an average of only \$23 over the 7-year period.

## Operating Expenses

During 1966, labor accounted for the major portion of total operating expenses in small plants with and

Table 34. Expenses: Average total operating expenses incurred by small plants with and without slaughtering facilities, 1960 and 1966

Cost item	Total operating expenses of plants in —			
	1960	1966	1960	1966
<i>With slaughtering facilities</i>				
Labor <sup>1</sup>	11,712	53	11,684	53
Supplies	2,953	13	2,364	11
Utilities <sup>2</sup>	2,805	13	2,797	13
Depreciation	1,573	7	1,908	9
Repairs	805	4	821	4
Insurance	700	3	679	3
Advertising	52	— <sup>4</sup>	168	1
Taxes	712	3	933	4
Other <sup>3</sup>	772	4	516	2
Total	22,084	100	21,870	100
<i>Without slaughtering facilities</i>				
Labor <sup>1</sup>	1,916	47	2,010	47
Supplies	312	8	574	14
Utilities <sup>2</sup>	975	24	969	23
Depreciation	384	10	163	4
Repairs	90	2	113	3
Insurance	71	2	123	3
Advertising	2	— <sup>4</sup>	7	— <sup>4</sup>
Taxes	159	4	177	4
Other <sup>3</sup>	115	3	89	2
Total	4,024	100	4,225	100

<sup>1</sup>Includes payroll taxes and fringe benefits.

<sup>2</sup>Includes electricity, heat, water, sewage, and telephone.

<sup>3</sup>Includes saw sharpening, laundry service, etc.

<sup>4</sup>Less than 1 percent.

without slaughtering facilities—53 percent and 47 percent, respectively—unchanged over 1960 (table 34). These percentage levels were substantially lower than those reported by larger plants.

When total labor expense incurred by the small plants is divided by man-years hired (table 26), the average annual increase was markedly less than in large plants. In small plants with slaughtering facilities, labor cost increased an average of 23 percent—from \$1.34 per hour in 1960 to \$1.65 in 1966. This 3.8-percent average annual increase exceeded the 1.7-percent average annual increase in labor productivity. Similarly, in small plants without slaughtering facilities, the labor cost increased from an average of \$1.02 per hour in 1960 to \$1.21 in 1966. Like the first group, the 3.2 percent average increase in labor cost exceeded the 0.7 percent average increase in labor productivity annually.

Supplies accounted for 11 percent of average total operating costs in 1966 in small plants with slaughtering facilities, a 2-percentage-point decline from 1960. As in large plants with slaughtering facilities, supplies cost

approximately \$1.30 per 100 pounds of product handled in 1960, but declined to \$1.19 per 100 pounds by 1966.

Supplies used by small plants without slaughtering facilities accounted for 14 percent of average total operating costs in 1966, a 6-percentage-point increase over 1960. Cost per 100 pounds of products handled doubled in 7 years, from \$0.52 in 1960 to \$1.04 in 1966. This increase is not typical of what occurred in the other three groups of plants. Managers of these small plants need to determine if supplies are being wasted during normal processing operations. Although the small quantity of supplies purchased during a year by these plants cannot assure them of volume discounts like many larger plants receive, managers may still want to contact competing suppliers to get a price comparison in an effort to lower the unit cost of these items.

Both groups of small cooperatives had greater proportional overhead costs—utilities, depreciation, repairs, insurance, and taxes—than large plants. For instance,

Table 35.—Revenue, expenses, and net gain (loss): Averages for small plants with and without slaughtering facilities, selected years

Item	Revenue, expenses, and net gain (loss) of small plants in—							
	1960		1962		1964		1966	
	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
<i>With slaughtering facilities</i>								
<b>Revenue:</b>								
Products	4,072	19	4,444	22	5,292	25	5,540	28
Services	17,393	81	16,007	78	16,158	75	14,363	72
Total	21,465	100	20,451	100	21,450	100	19,903	100
Expenses	-22,084	103	-22,423	110	-23,038	107	-21,870	110
Net gain (loss)	(619)	(3)	(1,972)	(10)	(1,588)	(7)	(1,967)	(10)
<i>Without slaughtering facilities</i>								
<b>Revenue:</b>								
Products	29	11	46	1	59	1	58	1
Services	3,933	99	3,817	99	4,752	99	3,957	99
Total	3,962	100	3,863	100	4,811	100	4,015	100
Expenses	-4,024	102	-3,852	100	-4,756	99	-4,225	105
Net gain (loss)	(62)	(2)	11	-2	55	1	(210)	(5)

<sup>1</sup>Over 0.5 percent is rounded to 1 percent.

<sup>2</sup>Less than 0.5 percent.

overhead costs in both groups of large plants for 1966 were 23 percent of total costs, compared with 35 and 39 percent in the small plants with and without slaughtering facilities. Overhead costs generally do not change as output changes. However, some expense items incurred by small plants actually increased between 1960 and 1966 while volume declined (tables 22 and 34).

### Net Gain (Loss) on Operations

Table 35 summarizes the data in tables 32, 33, and 34 and includes additional selected data for 1962 and 1964 for small plants with and without slaughtering facilities. Between 1960 and 1966 small plants with slaughtering facilities increased income from product sales to help offset the declining revenue from custom services. However, the net effect was a 7-percent decline in average total revenue. Almost without exception, small plants with slaughtering facilities reported net losses ranging from 3 to 10 percent of average total operating revenue during the four periods studied.

Financial losses on plant operations reduced members' equity in their cooperatives. Consequently, at some

future date when major repairs need to be made or obsolete and wornout equipment needs to be replaced, the necessary capital or credit potential may not be available.

On the average, small plants without slaughtering facilities derived 99 percent of their total operating revenue from custom services during 1966—unchanged since 1960. Except for an increase in 1964, total revenue remained generally unchanged between 1960 and 1966. Furthermore, the difference between revenue and expenses varied from a 1-percent net gain in 1964 to a 5-percent net loss in 1966.

Small locker plants with and without slaughtering facilities were operated almost entirely as a member service by diversified cooperatives, without regard to the economic performance of the locker plant itself. The boards of directors of these cooperatives should consider making their locker plant operations more responsive to their members' and patrons' changing needs and operate on a service-at-cost basis rather than as a continual loss operations.

## IMPLICATIONS FOR THE FUTURE

All frozen food locker cooperatives need to be vitally concerned about increasing volume of output and improving services to their members and patrons. Fur-

thermore, they need to be interested in programs that will aid them in (1) continuing as competitive business organizations; (2) attracting and holding additional

patrons; (3) being financially successful while providing services to members at cost; and (4) being able to comply with meat inspection and other governmental regulations.

Management of the large cooperatives needs to review policies on low-volume custom services, like dressing poultry. Revenue from these services often do not cover labor cost, let alone other costs attributed to them. Continuing such chronic loss services is not in the best interest of the cooperative or its members and does not follow the basic cooperative principle of services at cost. Management may want to make decisions on providing low-volume services only after it has brought the question to vote by the membership.

Processing wild game carcasses generally adds to the locker cooperative's net revenue. However, this service has caused a serious problem between members and patrons. Game carcasses are usually brought into the plant by nonmembers during November and December, the same time that many farmer-members want beef and pork carcasses custom processed. The volume of wild game usually makes it necessary to postpone processing members' meat products from 1 to 2 weeks. Locker cooperatives that can operate without accepting wild game should seriously consider discontinuing that non-member service in an effort to improve services to their members.

The strong demand for beef makes the limited size of the carcass age cooler the major restraint to future growth. Until large locker cooperatives increase the size of their age coolers, growth must come from (1) changing beef carcass aging techniques—age primal cuts rather than whole carcasses, lower aging time to 5 to 7 days from the traditional 10 to 14 days, or purchase pre-aged beef; (2) merchandising pork and other meat products that are not aged; (3) selling nonmeat food products; or (4) some combination of these.

Management must continue to increase labor productivity if it is to absorb rising labor costs while minimizing increases in service rates and product prices to their patrons. This can be accomplished by further mechanizing certain production activities, minimizing seasonal changes in output, and improving work skills of employees, all of which necessarily depend on increasing total volume of output.

Both groups of large cooperatives have growth potential, but patterns for growth differ markedly. The large cooperatives with slaughtering facilities need to serve a greater number of patrons with present principal services

and products. Therefore, should make necessary improvements in their slaughtering facilities to comply with proposed new mandatory Federal and State meat inspection regulations. Large cooperatives without slaughtering facilities need to serve present patrons more intensively with present principal services and products. After they have done this, then they might consider offering new services like livestock slaughtering.

Small locker cooperatives, whether they have livestock slaughtering facilities or not, experienced declining volume of output and increasing financial losses on plant operations since at least 1960. If present trends continue, many small cooperatives will be unable to justify investing capital in the facilities and equipment needed to comply with meat inspection requirements.

Small cooperatives with slaughtering facilities need to increase volume and patronage. They can do this primarily by merchandising beef and pork to home-freezer owners. They need to maintain an inventory of products rather than procure the meat for each patron's order. Also they need to advertise their products and services in the local trade area regularly to build repeat sales and to attract new patronage. Their merchandising program should first attempt to use idle plant facilities during seasonally low volume months and then offset declining custom processing volume during the seasonally high volume months.

While developing a merchandising program, small cooperatives with slaughtering facilities need to increase prices on meat products to assure a higher sales margin. They also need to increase custom service rates to cover the costs of providing those services. Furthermore, these cooperatives need to specialize in selected custom services, namely livestock slaughtering, meat processing, and pork curing, rather than provide the wide variety of low volume services they have offered in the past.

Increasing operating efficiency and controlling costs in these small cooperatives depends primarily on their increasing the volume of output. Increasing volume of output, in turn, depends primarily on their selling the kinds of products and providing the types of services member-patrons need and want.

The future of small locker cooperatives without slaughtering facilities is uncertain. Recent technological, economic, legal, and social changes have generally worked against the survival of these small cooperatives. For instance:

- (1) Plant facilities frequently need repairing and obsolete equipment needs replacing. Low and declining volume of output and continuing financial losses do not justify making the improvements needed to comply with proposed meat inspection regulations.
- (2) Small locker plants often are custom service departments of cooperative creameries. They will survive only as long as the parent organization, the creamery, survives. And in recent years many rural creameries have discontinued operations.
- (3) One manager generally is responsible for both the creamery and the locker plant operations, but he tends to have little personal interest in the success of the locker plant. Often the board of directors share the manager's indifference toward the locker plant. It will be nearly impossible to improve the locker plant if these attitudes prevail.
- (4) The rural trade areas served have lost some of their economic and social influence. This makes it extremely difficult for these cooperatives to develop any kind of program that has a substantial likelihood of success.

# APPENDIX

## Predicting Total Operating Income

Selected factors discussed in this report were analyzed to determine their usefulness in developing an equation for predicting total annual operating income. The following factors were used in a stepwise regression analysis:

1. Pounds of meat processed
2. Pounds of pork cured
3. Number of lockers rented
4. Number of animals slaughtered
5. Income from margins on sales
6. Income from meat processing
7. Income from cold storage rental
8. Income from livestock slaughtering
9. Income from pork curing
10. Number of patrons served

Separate analyses were made for large plants with and without slaughtering facilities. The analyses were based on 7 years' data, rather than on the four time periods used in this report to assure a greater degree of accuracy.

### Large Plants With Slaughtering Facilities

Total annual operating income for large plants with slaughtering facilities was significantly influenced by only three of the 10 factors—number of patrons served, income from meat processing, and income from livestock slaughtering (appendix table 1). It also compares total annual operating income actually reported by the cooperatives with the estimated income computed from the equation shown in footnote 2 of the table. The predicting equation and statistical coefficients relating to the analysis is expressed as:

$$X_1 = -4253.7500 + 15.0930X_2 + 1.2052X_3 + 0.5848X_4$$

(3.1646)      (0.1678)      (0.1389)

where  $R^2_{1,234} = 0.9749$ ; and  $S_{1,234} = \$4,194.9958$  and where  $X_1$  is the mathematical character for total annual operating income;  $X_2$  represents the number of patrons served;  $X_3$  represents income from meat processing; and  $X_4$  represents income from livestock slaughtering (excluding income from sale of beef hides).

This equation shows that when all other factors remain unchanged, each additional patron served ( $X_2$ ) by the

large plant with a slaughtering facility increased total annual operating income by \$15.09. Associated with this is a standard error of \$3.16 (3.1646). After allowing for this error, each additional patron increased total annual operating income between \$11.39 and \$18.25.

Similarly, all other factors remaining unchanged, each additional dollar from meat processing ( $X_3$ ) added \$1.21, plus or minus the standard error of 17 cents (0.1678), to total annual operating income. Apparently, patrons who had meat processed at their cooperative also requested other income producing services.

Each additional dollar received from livestock slaughtering ( $X_4$ ) added only 58 cents, plus or minus 14 cents (0.1389), to total annual operating income. On first glance, this may appear unreasonable, but recall that these plants included the beef hide as part of the slaughtering fee. However, the beef hide was considered income from sales of products. To use the above predicting equation:

- (1) Determine the number of patrons served, the amount of money received from meat processing, and the amount of money received from livestock slaughtering (excluding income from sale of beef hides), as well as total annual operating income for last year.
- (2) Multiply the number of patrons served last year by 15.0930.
- (3) Multiply last year's meat processing income by 1.2052.
- (4) Multiply last year's livestock slaughtering income by 0.5848 (Do not include income from sale of hides.)
- (5) Add answers obtained in steps 2, 3, and 4 above.
- (6) Subtract \$4,253.75 from the answer obtained in step 5 above. The difference is the dollar value of  $X_1$  which is "estimated total annual operating income." Compare this computed estimate to last year's total operating income. They will be within \$4,195 ( $S_{1,234} = \$4,194.9958$ ) of each other at least two thirds of the time.

Appendix table 1.—Revenue: Actual and estimated total annual operating income of large plants with slaughtering facilities, and related factors, 1960-66

Year and plant number	X <sub>1</sub> Total annual operating income			X <sub>2</sub> Patrons served	X <sub>3</sub> Income from meat processing	X <sub>4</sub> Income from livestock slaughtering
	Actual <sup>1</sup>	Estimated <sup>2</sup>	Difference between actual and estimated			
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Number</i>	<i>Dollars</i>	<i>Dollars</i>
1960:						
1	41,510	40,650	860	1,200	20,840	2,865
2	76,815	75,830	985	2,200	26,805	24,923
3	111,985	100,700	11,285	2,900	43,815	14,330
4	58,160	52,790	5,370	1,900	21,530	4,140
1961:						
1	44,915	43,930	985	1,200	23,590	2,805
2	74,925	73,770	1,155	2,000	28,695	22,670
3	107,495	103,570	3,925	2,900	46,380	13,945
4	62,835	63,405	570	1,900	30,015	4,800
1962:						
1	47,935	45,305	2,630	1,250	24,040	2,945
2	70,170	65,070	5,100	1,800	25,890	18,730
3	110,035	106,365	3,670	3,000	47,715	13,400
4	58,440	62,110	3,670	2,000	26,120	8,035
1963:						
1	47,140	48,515	1,375	1,250	26,625	3,105
2	74,910	77,250	2,340	2,200	30,195	20,360
3	110,905	111,805	900	3,100	50,580	14,215
4	59,580	64,670	5,090	2,100	25,940	10,200
1964:						
1	50,085	49,685	400	1,300	26,555	3,955
2	89,720	90,065	345	2,400	36,635	23,840
3	117,490	117,475	15	3,150	53,650	16,290
4	62,635	71,510	8,875	2,225	30,825	8,605
1965:						
1	50,605	50,675	70	1,300	27,280	4,160
2	86,890	91,905	5,015	2,500	36,575	24,530
3	117,690	116,255	1,435	3,000	54,880	15,545
4	78,550	80,810	2,260	2,100	40,220	8,370
1966:						
1	58,075	56,910	1,165	1,350	31,620	4,585
2	93,990	94,055	65	2,350	39,990	25,040
3	113,590	119,295	5,705	3,200	55,290	14,730
4	78,815	81,520	2,705	2,150	41,490	5,675

<sup>1</sup> Compiled from audit reports furnished by each cooperative.

<sup>2</sup> Estimated using the following equation. Figures in parentheses are errors of estimates:

$$X_1 = -4253.7500 + 15.0930X_2 + 1.2052X_3 + 0.5848X_4$$

$$(3.1646) \quad (0.1678) \quad (0.1389)$$

The following statistical coefficients relate to this analysis:

$$R^2_{1.234} = 0.9749; S_{1.234} = \$4,194.9958$$

The values in the last row of appendix table 1 (plant 4, 1966)—2,150 patrons, \$41,490 income from meat processing, and \$5,675 income from livestock slaughtering—can be used to illustrate the above procedure.

$$X_1 = -4253.7500 + 15.0930(2150) +$$

$$1.2052(\$41,490) + 0.5848(\$5,675)$$

$$X_1 = -4253.7500 + (32,449.9500 + 50,003.7480 +$$

$$3,318.7400)$$

$$X_1 = -4253.7500 + 85,772.4380$$

$$X_1 = \$81,518.68 \text{ rounded to } \$81,520$$

Compare the computed estimated  $X_1 = \$81,520$  to the actual  $X_1 = \$78,815$ . The \$2,705 difference between the estimated and actual total annual operating income is less than the standard error of \$4,195.

The predicting equation has useful business applications. For example, a large plant with slaughtering facilities intent on increasing volume of output by increasing patronage can predict the impact such a

Appendix table 2.—Revenue: Actual and estimated total annual operating income of large plants without slaughtering facilities, and related factors, 1960-66

Year and plant number	X <sub>1</sub> Total annual operating income			X <sub>2</sub> , Income from meat processing	X <sub>3</sub> , Pork Cured	X <sub>4</sub> , Margins on sales
	Actual <sup>1</sup>	Estimated <sup>2</sup>	Difference between actual and estimated			
	Dollars	Dollars	Dollars	Dollars	Pounds	Dollars
<b>1960:</b>						
1	57,860	57,950	90	33,950	52,550	7,550
2	97,660	100,770	3,110	52,025	209,155	6,840
3	57,620	56,130	1,490	30,230	61,860	8,770
4	19,760	21,895	2,135	7,580	30,875	3,335
5	38,140	30,700	7,400	18,100	15,640	2,425
<b>1961:</b>						
1	52,485	54,675	2,190	32,070	45,975	7,295
2	97,760	97,870	110	54,335	185,480	4,330
3	62,245	60,895	1,350	33,310	60,200	10,745
4	21,615	23,615	2,000	7,165	31,060	6,065
5	33,725	32,910	815	20,300	9,325	3,285
<b>1962:</b>						
1	44,860	48,970	4,110	31,830	39,735	1,595
2	97,010	94,800	2,210	55,610	160,195	3,370
3	62,950	61,340	1,610	33,430	61,220	10,950
4	27,900	28,620	720	7,000	36,830	11,545
5	35,945	28,330	7,615	16,320	8,035	3,370
<b>1963:</b>						
1	49,860	54,310	4,450	36,895	37,985	1,500
2	97,635	92,710	4,925	54,940	144,800	4,555
3	61,800	61,920	120	35,160	61,300	9,220
4	35,245	36,330	1,085	10,585	51,945	13,390
5	36,970	33,505	3,465	19,805	9,560	4,695
<b>1964:</b>						
1	51,790	55,850	4,060	38,805	34,810	1,340
2	95,620	90,450	5,170	54,035	136,455	4,530
3	63,160	63,355	195	37,665	62,250	7,310
4	32,780	36,040	3,260	12,800	58,335	8,700
5	38,490	35,460	3,030	17,210	10,895	10,585
<b>1965:</b>						
1	58,985	62,615	3,630	40,125	37,775	7,470
2	94,420	92,050	2,370	52,655	156,665	4,730
3	63,400	65,075	1,675	39,040	61,335	7,710
4	33,670	35,865	2,195	12,130	43,480	12,200
5	50,870	48,940	1,930	23,875	11,905	18,000
<b>1966:</b>						
1	77,420	82,520	5,100	53,890	67,555	7,590
2	97,075	97,690	615	52,660	169,070	9,540
3	66,430	68,090	1,660	39,730	61,800	10,460
4	30,995	34,485	3,490	12,230	44,425	10,140
5	55,645	52,915	2,730	25,450	13,225	20,550

<sup>1</sup> Compiled from audit reports furnished by each cooperative.

<sup>2</sup> Estimated using the following equation. Figures in parentheses are standard errors of estimates:

$$X_1 = 6202.8716 + 1.1194X_2 + 0.1478X_3 + 0.7914X_4$$

$$(0.0584) \quad (0.0166) \quad (0.1383)$$

The following statistical coefficients relate to this analysis:

$$R^2_{1,234} = 0.9816; S_{1,234} = \$3,433.1897$$

patronage change will have on total annual operating income. Simply substitute the anticipated level of patronage for the present level in the formula, and recompute steps 2 through 6. Different values for income from meat processing and income from livestock slaughtering can also be substituted in the formula, each time recomputing steps 2 through 6.

Naturally, the cooperative does not expect to change one factor while all others remain constant. It may increase the service rates for meat processing. It knows that a rate increase will result in loss of a few patrons. Once the magnitude of these changes is determined, put them in the equation, recompute steps 2 through 6 and determine the new estimated total annual operating income.

The three variables—number of patrons served, income from meat processing, and income from livestock slaughtering—accounted for 97 percent ( $R^2_{1,234} = 0.9749$ ) of the variation in total annual operating income.

### Large Plants Without Slaughtering Facilities

The statistical data used in estimating total annual operating income for large plants without slaughtering facilities over a 7-year period are included in appendix table 2. The predicting equation and statistical coefficients relating to the analysis are shown in footnote 2 of that table.

Total annual operating income for large plants without slaughtering facilities was significantly influenced by only three of the 10 factors—income from meat processing, pounds of pork cured, and income from margins on sales.

Based on the equation,  $X_1 = 6206.8716 + 1.1194X_2 + 0.1478X_3 + 0.7914X_4$ , when other factors are held constant, each additional dollar received from meat processing service ( $X_2$ ) added \$1.12, plus or minus a standard error of 6 cents, to total annual operating income. Each additional pound of pork cured ( $X_3$ ) added another 15 cents, plus or minus 2 cents, to total income. And finally, each additional dollar from sales ( $X_4$ ) added 79 cents to total income. A 14-cent standard error is associated with this third factor. To use the predicting equation:

- (1) Determine the income from meat processing, the pounds of pork cured, and income from margins on sales as well as total annual operating income for last year.
- (2) Multiply last year's meat processing income by 1.1194.
- (3) Multiply the pounds of pork cured last year by 0.1478.
- (4) Multiply last year's income from margins on sales by 0.7914.
- (5) Add \$6,206.87 to the answers obtained in steps 2, 3, and 4. This is the dollar value of  $X_1$  which is "estimated total annual operating income." Compare this computed estimate to last year's actual total operating income. They will be within \$3,433 ( $S_{1,234} = \$3,433.1897$ ) of each other at least two-thirds of the time.

The three variables accounted for 98 percent ( $R^2_{1,234} = 0.9816$ ) of the variation in total annual operating income among these cooperatives.





## Other Publications Available

Guide to Uniform Accounting for Locker and Freezer Provisioners, Agriculture Handbook 163. Thornton W. Sneed, Sr., and Paul C. Wilkins.

Changing Productivity and Efficiency of Frozen Food Locker Cooperatives, FCS General Report 147. Richard P. Parsons.

Frozen Food Locker and Freezer Provisioning Industry, 1965, Marketing Research Report 779. Bert D. Miner, William R. Seymour, and Richard P. Parsons.

The Changing Role of Frozen Food Locker Cooperatives, Service Report 83. William R. Seymour.

Management Accounting for Frozen Food Locker and Related Plants, Agriculture Handbook 220. Robert L. Dickens.

Business Management of Frozen Food Locker and Related Plants, Marketing Research Report 258. James J. Mullen and Lloyd M. DeBoer.

A copy of each of these publications may be obtained while a supply is available from—

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